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# ECONOMIC GEOGRAPHY

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## OCTOBER

CITY PATTERN OF DURHAM, N. C.
Coy T. Phillips

NEW ZEALAND: MARKETING A PASTORAL SURPLUS
Irene A. Moke

A PROGRAM FOR STABILIZING THE FISHERY OF WASHINGTON
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GOLDFISH INDUSTRY OF MARTINSVILLE, INDIANA
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CH'ANG-CH'UN
Norton S. Ginsburg

RECONSTRUCTION OF PHILIPPINE AGRICULTURE
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## CITY PATTERNS

CHARACTER, composition, and function of cities are in many cases revealed by their pattern of structure, street, and activities. Interpretation of their history, development, and economic and cultural role, depends in large part upon distribution of their factories, shops, residences, offices, and hostelries. The pattern of their population reflects their history, evolution of their industries and functions, and in some measure their economic status and standard of living.

Cities vary widely in patterns of their component parts, evolution of their forms and functions, and relationship of cultural development to factors of site and situation. They may reflect distinctly, and distinctively, the kind and quality of folk who have dwelt in them; the major activities in which those folk engaged; the vicissitudes of their growth; or their relationship to the countryside or country in which they are set. They form an index to the role their environs have played in world affairs. They reveal the poverty or wealth of the territory which forms their tributary periphery.

London, New York or Paris; Cairo, Canton or Calcutta; Rome, Chicago or Buenos Aires; Athens, Stockholm or Vienna; the pattern of each city represents a cultural fabric of varied warp and woof, history and geography.

ECONOMIC GEOGRAPHY

VOL. 23 OCTOBER, 1947 No. 4

# CITY PATTERN OF DURHAM, N. C.

*Coy T. Phillips*

DURHAM is an industrial city of more than sixty thousand people in the northeastern part of the North Carolina Piedmont. Although located in the midst of poor farming country, the city's industrialization is based mainly on two great industrial crops, cotton and tobacco; though somewhat removed from the Durham region, both are within easy reach of the city's industrial plants. In addition to being an industrial city, Durham has become an important commercial center and in recent years has risen to prominence as an educational center.

## THE CITY IN ITS SETTING

The city is located on a low divide in the eastern part of the Piedmont Plateau. The Piedmont is a major physiographic region in the eastern United States, extending from New York to Alabama. It is one of three geographic divisions in North Carolina (Figure 1) and constitutes about 45 per cent of the land area of the state. The region slopes in a southeasterly direction from the base of the Blue Ridge Mountains to the edge of the Coastal Plain. The larger streams, some of which have their origin in the western mountains, have cut their valleys from the northwest to the southeast across the Piedmont, but numerous tributary streams from other directions have cut the surface into a complex pattern. In most cases the interstream areas are locally of uniform elevation. Along stream divides usually are found the least dissected lands of the Plateau, and it was, therefore, along the fairly level northwest-southeast ridges that early transportation lines developed. It was there that the early trails were worn, the first roads were built, and later railroads were constructed. Towns grew up at intervals convenient for trade and where natural north-south routes crossed the divides important collecting and distributing centers developed.

## GROWTH OF THE CITY

Durham originated about the middle of the last century as a station on a state-owned railroad which followed the water-parting between the Neuse and the Cape Fear rivers. Choice of the site appears to have been a matter of convenience in the spacing of stations since there are no strong relief factors in the area which designated it as a transportation focal point. The newly-built railroad, however, did flank the southern edge of the Old Bright Tobacco Belt (Figure 1) which was beginning to develop in the northern Piedmont of North Carolina, and locations along it offered advantages in shipping manufactured tobacco.

Rapid growth of Durham in the post Civil War period was due to its leadership in the tobacco manufacturing

industry. Bright tobacco had become popular as smoking tobacco before the Civil War, and in the postwar period the pipe-smoking habit spread rapidly in this country, especially in the North. Durham, being a new town free from tradition, rose rapidly as the chief tobacco manufacturing center in North Carolina. There seems little doubt that much of the growth was due to the foresight and aggressiveness of a few leaders in the industry. It so happened that several leaders, the most notable of whom was James B. Duke, founder of the original American Tobacco Company, lived in Durham. Gradually the more aggressive manufacturers emerged as leaders and with rise to popularity of the cigarette which required machine operations, large capital investments in equipment, and elaborate sales organizations, small operators disappeared or merged with the larger firms. By 1890 two Durham manufacturers, W. Duke Sons and Company and the "Bull Durham" Factory, dominated the industry in the state. Factories of the two companies, the former as part of

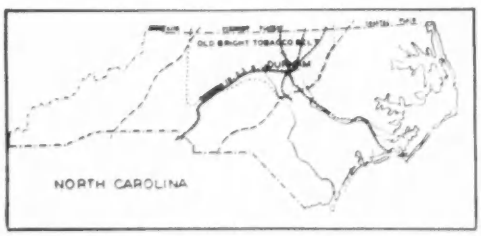



FIGURE 1.—The setting of Durham. Durham is located on a low divide in the eastern part of the Piedmont plateau, where interstream areas are locally of uniform elevation, and where early transportation lines developed along the fairly level northwest-southeast ridges.

Liggett and Myers Tobacco Company and the latter as part of the "new" American Tobacco Company, are operating in the original plants, now enlarged, and today provide about one fourth of the cigarettes and a considerable quantity of the smoking tobacco manufactured in this country.

In a very real sense Durham may be called "The City That Tobacco Built." Along with tobacco factories came such allied industries as the auction sales warehouse, re-drying plants, and tobacco storage warehouses, each of which is a conspicuous feature of the landscape. Moreover the industry has attracted a large number of negroes who find employment in various phases of the manufacturing process. It should be noted also that tobacco money attracted other industries to the city. Textile plants of East Durham and West Durham and associated mill villages were financed by tobacco men and tobacco cash. Two institutions of higher learning, Duke University and North Carolina College for Negroes, were endowed by tobacco wealth.

## ORIENTATION OF THE CITY

Inasmuch as the city of Durham grew up on a railroad that follows the water-parting of two of North Carolina's river systems, it should be recalled that the large streams of the state and their intervening divides have a northwest-southeast trend. The town oriented itself originally in the general northwest-southeast direction of the railway. Through the center of the city there is, in most places, an alignment of streets parallel to and at right angles to the railroad which itself curves in a number of places in adjustment to topography. On both sides of the railroad numerous transverse ridges have been carved out of the main ridge by headward erosion, from the north and south, of a number of small streams. The work of such streams, which have cut their valleys to a depth of about a hundred feet below the ridges in the northern and southern parts of town, has given the city a rolling topography that has

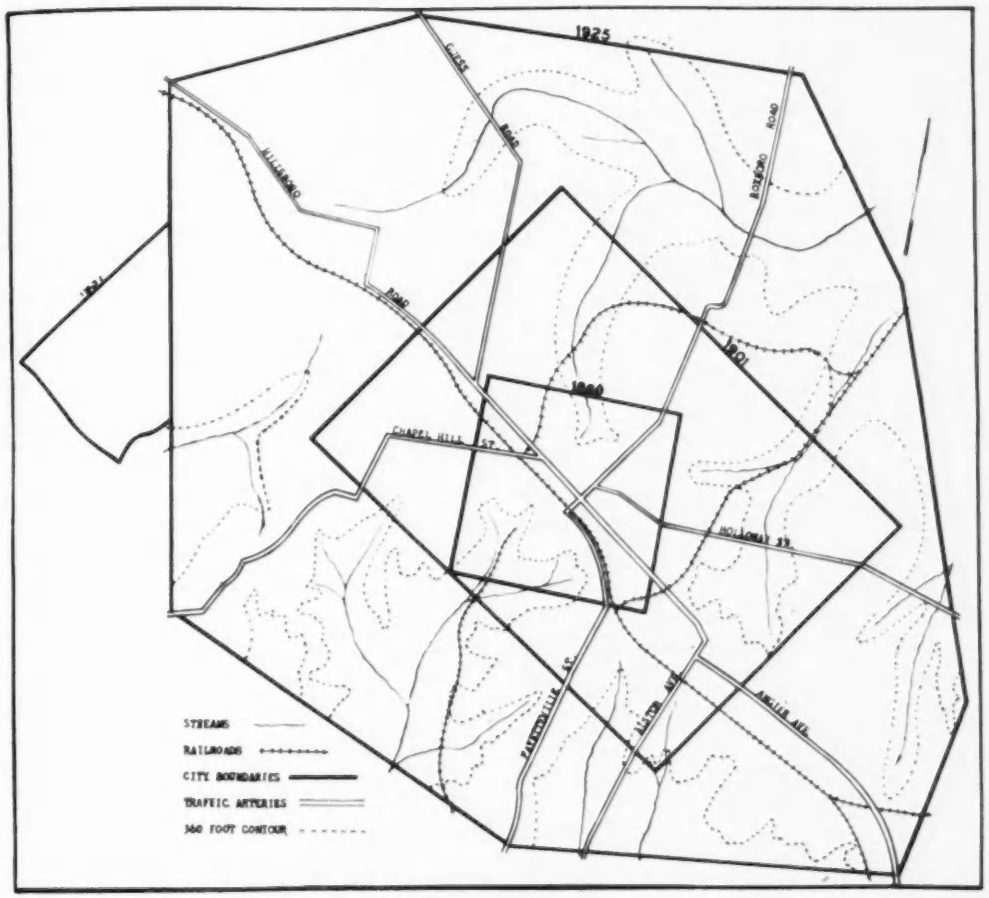



FIGURE 2.—Orientation and growth of Durham. Successive stages in the evolution of Durham from village to industrial city are indicated by the boundaries shown on this map, and by development of the major roads.

done much to shape the pattern of urban development. The early highways approached Durham along the crests of some of the transverse ridges and streets were laid out along others. The transverse roads and streets were by no means in perfect alignment with the railroad. There was a good deal of winding and twisting and there were several dead-end streets. The founding fathers attempted to align the town in a north-south and east-west direction and imposed this pattern upon the earlier irregular streets. The town they incorporated extended a half mile in each direction from the station, but, as is shown in Figure 2, the alignment was with the compass and not with the railroad. A number of the streets in the periphery of the old town and some that approached the heart of the village were aligned with the town boundaries in either east-west or north-south directions. All of these factors have greatly complicated and confused the street pattern in the business district, with the result that there are dead-end streets, traffic bottle-necks, and wedge-shaped business blocks.

Industrial developments have further complicated the present day pattern. One of the original streets which closely

paralleled the main railroad was taken, in part by additional tracks and in part by business structure, so that today there are only short stretches of it left here and there. Factories were built near the center of town and, expanding across narrow streets, left little for widening thoroughfares. Factories brought additional railroads, one of which makes a street-level crossing on Main Street near the heart of town and another similar crossing at the eastern end of the business district.

The original town grew up around tobacco plants with residential districts developing along ridge tops mainly north of the railroad but also on transverse ridges south of it. Gradually additional industrial plants, tobacco storage warehouses and wholesale and retail establishments spread in an east-west direction on higher ground which lies mainly north of the railroad. When textile plants, financed by tobacco men, came late in the century, the mills with their mill villages were established along the railroad to the east and west outside the limits of the original town. When city limits were expanded in 1901 they reflected the elongated development of the population pattern by taking the shape of a rectangle (Figure 2) which ran parallel to the main railroad.

Since the turn of the century, with use of the motor car and the development of rapid urban transportation, there has been further reorientation of the urban pattern. As industrial plants and commercial establishments expanded and as freight traffic increased, the old town became less desirable for residential purposes. New residential areas gradually developed radially out along highways which generally followed transverse ridges from the business district. With freight yards and mill villages as deterrent factors in the east and west, home builders established communities to the north and south outside limits of the rectangular city. In 1925 the city boundary was extended to include the newer communities and at that time the boundary was extended nearly as far from the center of town north and south as east and west (Figure 2). Incorporation of the West Campus of Duke University in 1937 constitutes the only boundary change in recent years.

### Location of Industrial and Commercial Districts

The chief business district lies in the center of town roughly parallel to the main rail line and chiefly north of it. It extends continuously along the railroad nearly a mile in each direction from the center of town (Figure 3). The district is irregular north and south where industrial plants and warehouses have been extended along branch rail lines and where retail stores have been established along major traffic arteries. Outside the chief business district, industrial plants and warehouses are found at rather frequent intervals along the railroad to the city limits and beyond. A few industrial plants are found in areas without rail facilities, usually on low ground poorly suited for residential use. Most small outlying business areas shown in Figure 3 are retail stores which have developed at important traffic intersections to serve residential communities. In many instances isolated retail stores are found scattered in residential districts, having been established there before zoning laws were enacted.

### Residential Areas

Several geographic, economic, and social factors have helped to shape development of Durham's residential pattern. We have seen that the axis of the city is oriented with the railroad,

which follows a stream divide, and that other parts of the transportation pattern have been laid out largely in conformity with transverse ridges. In general, therefore, the city is built on undulating topography over which the population has spread radially from the central core. Most of Durham's people receive a prewar income of a thousand dollars per year or less and three-fourths of them do not own their homes. This low economic status has affected the urban pattern by the economic ceiling it has placed over the quality of homes constructed in the city. Moreover the city has attracted a high percentage of negroes, many of them factory laborers and domestic servants of low income, who further complicate the residential pattern.

The pattern of occupance was largely shaped in the early days of rapid growth and of slow and limited transportation facilities. It was necessary to build homes close to the factories, and so the older town was elongated (Figure 2) to make labor accessible to the tobacco factories in the center of town and the textile mills on the railroad east and west of town. It was easy to build and maintain roads and streets along ridges where the land was comparatively level. High ground, therefore, was most desirable for home sites and there

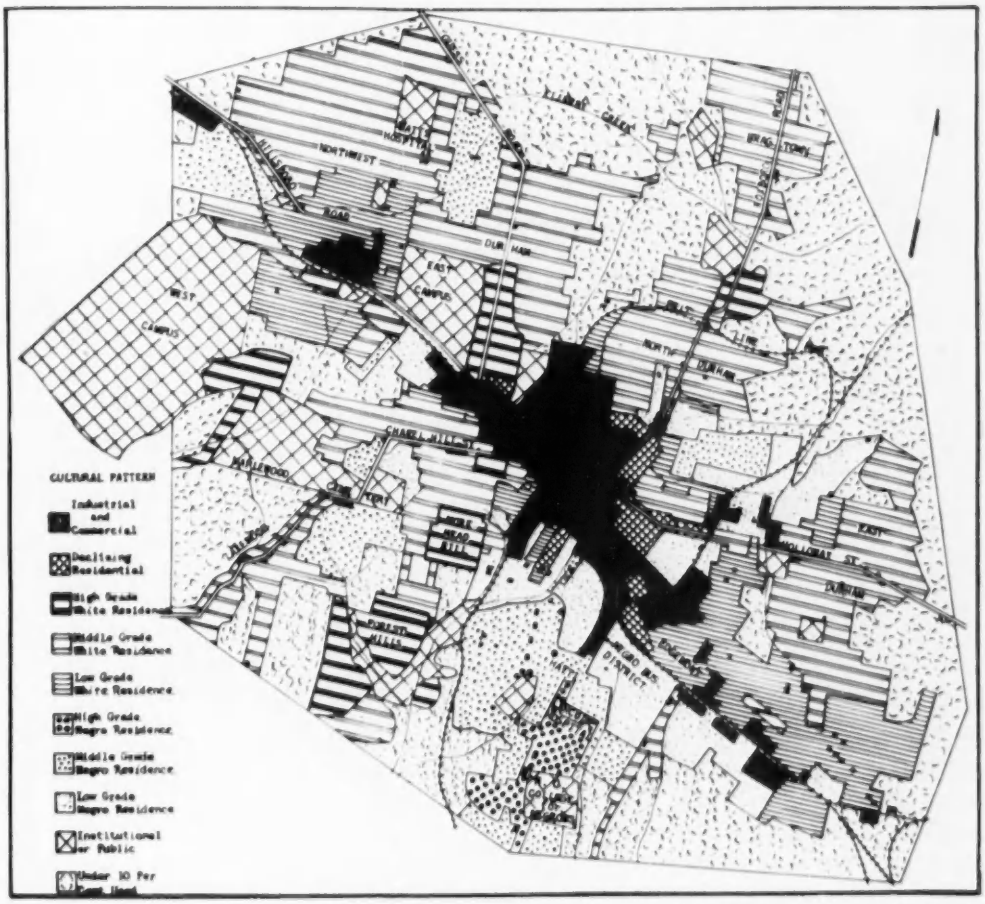



FIGURE 3.—Cultural pattern of Durham. The several functional and cultural areas of the city are clearly brought out by the pattern of the legend. The aggregation of more intensive uses of the area along the lines of communication is clearly presented.

the more prosperous people built their homes. In the hollows behind the whites, often in close proximity to them, shacks of negro laborers were constructed. Often factory owners built and owned houses to alleviate housing shortages in the rapidly growing town. The poor whites tended to collect in mill villages close to the textile plants east and west of town but tobacco factories also attracted white laborers in the central portion of the town.

The highest land in the city is north of the railroad; it is now largely occupied by the business district, but when the town was small many of the best early homes were built there. South of the railroad a few high-class communities were established on high ground, but for a long while most of the southern section was left to poor whites and negro laborers, or remained vacant. Mill villages, as we have seen, early developed their own communities with company-owned houses in East Durham and West Durham. In time, as the city grew and transportation improved, it was possible to live farther away from town. Then settlements spread along highways leading out of town. Usually highways were on ridge tops and from ridge tops the communities spread. Low ground between ridges was left vacant or was inhabited by negroes or poor white people, a condition which generally prevails to the present.

In mapping residential areas of Durham the writer recognized three grades of white and three grades of negro residences, in addition to a white area designated as Declining Residential (Figure 3). The terms high, middle and low grade are rather arbitrary and though they are correct in a broad sense, more detailed study would reveal many local discrepancies. Furthermore, it should be remembered that the general level of negro residence is lower than that of white people, a high-grade negro residence being approximately equivalent to that of middle-grade white. In general the residential pattern has been strongly influenced by topographic features and by such cultural features as location of transportation routes and industrial plants. There are relatively few large areas completely occupied by people of like financial and social standing. This, we should recall, came about partly because expansion developed along transverse ridges with wealth taking to the high ground and poverty

FIGURE 4.—A boardinghouse that occupies a former residential mansion. Most of the residents of such old places have died or moved away, and the present residents are largely young people, such as clerks, stenographers, salesmen, and teachers.

to the low. The pattern was further complicated by allowing negro population to accumulate in hollows and collect along back streets and alleys in many parts of town. Such conditions have created many transition zones which are almost invariably unstable districts. There are no marked physiographic barriers and few "green belts" to prevent such zones of instability. (The "green belt" is a device now being used in some cities and advocated by many city planners for eliminating or preventing the spread of unstable zones that commonly exist between areas of conflicting land use.)

*Declining Residential Areas:* The high ground north of the railroad afforded some of the most attractive home sites in the city and some of the best early homes were built there, but there also, the business district started and expanded. As more and more room was needed for business, expansion took place at expense of the old residential section. An uprooting process, therefore began several decades ago which continues until the present.

Such uprooting has created a zone which is mapped as the "Area of Declining Residence." Most of it is shown in the culture map, but there are sections within the business district where the uprooting process has not been completed. Nearly all of it is either in the business district or in areas adjacent to it which have been zoned for future business.

Much of the area was at one time high-grade residence, fine old homes with slate roofs built by early tobacco wealth when the town was small. Several streets which were once choice locations are now in rather advanced stages of decay. Most of the old residents are gone, the houses are run down, and cheap boarding and rooming houses prevail. Northeast of the business district, however, is a large area covering several city blocks (Figure 3) which has been zoned for business but where a number of fine old structures are intact, many of them well preserved. Business has been rather slow in moving in this direction but since the area is nearly surrounded either by business structures or poor negro residential districts it is doomed to eventual decay.

FIGURE 5.—An exclusive residential area with ample space about the houses, attractive landscaping, and broad vistas. They form the homes of successful industrialists and business men, professional men, and others of means.

Although the area is declining as a residential district, it still performs an

important role in housing certain classes of people. It is the zone of boarding-houses (Figure 4), furnished rooms, and apartments occupied by people of moderate to low incomes. The inhabitants are largely young people such as clerks, stenographers, salesmen, and teachers, some of whom are temporary or transient residents. Most of them are unmarried, but newly married, childless couples are numerous. A few of the old residents still remain, but most of the old people have died or built new homes in the peripheral zone. Although rooming and boardinghouses predominate there are a number of functions, other than residential, carried on in the old homes. For example, on one street a Christian Science reading room and Sunday School rooms occupy a dwelling house. A little farther along a large old home served as a U.S.O. center during the recent war. Along major highways are tourist homes and on busy streets front yards and porches are converted into fruit stands. One house provides an office for a chiropractic physician, another houses a funeral home, and in still another a jeweler and watchmaker plies his trade.

As the old residences give way, space-hungry businesses move in. Typical among such businesses are auto sales and services, filling stations, used-car dealers, dry-cleaning plants, bottling works, dairies and super markets. Here too are found bus stations, ice plants, tire rebuilders, and wholesale houses requiring display rooms. While property values slowly rise for business purposes, remaining residences in the district are gradually "bled" for what they have to offer in rental value.

*Exclusive White Residential Areas:* Like most tobacco cities, Durham has several areas with fine homes but there are few large estates with great mansions and extensive grounds. Homes of successful industrialists, merchants, bankers, college professors, lawyers, and doctors are scattered in small widely separated areas through north, west, and southwest Durham.

FIGURE 6.—A cottage district in East Durham, a section of middle-class residences that occupies a north-south ridge near the eastern edge of the city, made accessible by Holloway Street, a major highway which leads to Raleigh.

Scattering of high-grade residences which is perhaps a bit unusual results from a number of factors. Before the use of motor cars many of Durham's early industrialists built their homes near their factories, frequently across the tracks from them. Since the factories were scattered along the railroads the homes of the owners were located near by on high ground in clusters of three or four or more homes. The first exclusive residential district started after the first flush of tobacco wealth in the late 1880's. About 1890 a group of wealthy young married couples estab-

lished a community on a hill southwest of the business district a few blocks from the tobacco factories. The settlement spread to include several blocks (Figure 3) and is still rated as one of the best sections (Figure 5) of the city. Another high-grade settlement occupies a strip of land just east of the East Campus of Duke University. There the pressure for land is too great to permit spacious grounds and there are many rooming houses and apartments but the houses are generally large and well kept. More recently high-grade residences have moved into peripheral areas. A small section near the West Campus of Duke University has possibilities and ample room for expansion. A part of the Forest Hills section in the southwestern part of the city ranks with the best in Durham. The two last mentioned sections have reversed an old and persistent trend in the city. Here are the only places in Durham where wealthy people have recognized that winding streams and broad meadows can provide background for beautiful homes.

*Middle-Class White Residential Areas:* The middle classes of Durham live in five major and a few minor areas. In general the middle-class residences occupy transverse ridges and extend from the edge of the business district to the peripheral zone. All major areas are on the ridges, four of them north of the railroad and one south (Figure 3). They obviously started as settlements along the ridge highways and gradually spread to cover upper slopes. The zones are separated by low ground, by railroad lines or other barriers, but, where a major thoroughfare passes through and beyond a relief or cultural barrier, built up areas sometimes re-

FIGURE 7.—Emergency housing in the periphery of East Durham, where in one of the city's wartime housing projects the natural charm of the wooded area and winding streets was somewhat marred by monotonous uniformity of the structures.

FIGURE 8.—Cottages in the mill district of East Durham. It is actually formed of two villages, one close about the early cotton mills, the older East Durham, and the other Edgemont, developed closer to the business district.

appear on the other side of the barrier. In all the districts most active growth is taking place in peripheral areas and some are being extended beyond the city limits.

Middle-class residences constitute the largest white residential districts in the city. It should be borne in mind that there are discrepancies in classification and that there is considerable range in quality of homes within the areas. A few cheap houses sometimes intermingle with the better classes and there are some high-class homes housing prominent people that have been mapped as a part of the middle-class group in order to avoid a too detailed refinement. For example, there are some fine old houses in North Durham along the chief thoroughfare but they are too few to set them apart. Also in Northwest Durham near Watts Hospital are found many very good homes occupied largely by professional people.

a. East Durham: The middle-class residences of East Durham occupy a north-south ridge near the eastern edge of the city. The thoroughfare to the heart of this part of East Durham is Holloway Street, a major highway which leads to Raleigh. The middle-class residences begin on Holloway Street near the eastern edge of the business district but are interrupted by low ground. The low ground is either unoccupied, used by industrial plants or inhabited by negroes. Beyond the lowland barrier medium white residences spread for many blocks on both sides of Holloway Street until stopped by a negro community on the north and the old mill village of East Durham on the south.

The residents of the section are about as homogeneous as can be found in any part of the city. There are no show places, most of the homes being of the modest middle-class cottage type (Figure 6). Only small zones of deteriorating homes are found facing the negroes in the north, the low ground on the west, and the mill village to the south, while the eastern edge facing the open country is characterized by newly constructed modern cottages. In the extreme northeast one of the city's wartime housing projects was built on winding streets in a wooded area, but its natural beauty is somewhat marred by uniformity of structures (Figure 7).

FIGURE 9.—A millworker's house in West Durham. A new community built about the Erwin mills. Rents are low, there is adequate ground for garden and an atmosphere of sociability and comparative well-being.

b. North Durham: North Durham lies mostly between the business district and the Belt Line Railroad. In recent years the community has spread northward beyond the railroad to a wooded slope facing Ellerby Creek. It is a

broad ridge serrated in places by small streams and is almost completely surrounded by low ground. It is over the ridge that an early road led to Roxboro, Oxford, Henderson and other small towns in the northern part of the state.

Because of its proximity to the business district, the area early became a popular location for homes and many of the town's leading citizens settled there. A number of fine homes were built along the crest of the ridge; many of them still remain, but some parts of the community are declining. As a consequence, it has become more heterogeneous than some other parts of the town. Along the southern edge, facing a negro district and a business cluster, and on the west, facing factories and railroad yards are transitional zones which show deterioration. To the north, however, there are many houses of recent origin several of which approach the high income class. Except for blighted areas the neighborhood as a whole is rather high middle class. Its convenience with respect to the business district gives promise of continued popularity provided the blighted areas can be restored to desirability. An attempt has recently been made in this direction by means of a housing project in the southern edge near the business district.

FIGURE 10.—A negro residential street near the negro college in the southeast part of the city on rolling and well-drained land, some distance from the business district.

c. Bragtown: Bragtown is, in a sense, an extension of North Durham which grew up along the Roxboro Road beyond the low ground on Ellerby Creek. It is, in part, a suburban area that spreads several blocks east and west of the highway both within and without the city limits. It is a good, average community of the cottage type, housing a considerable range of people mostly in the middle income group. Many houses are of recent construction and there are several blocks to the east and on the low ground along its southern edge that have wartime housing projects. The suburban part is a popular place for the family in search of garden space, city services, and low tax rates. Since there is abundance of good home sites, no negro settlements, and no blighted areas, the section shows promise of growing and remaining a substantial community.

d. Northwest Durham: Northwest Durham extends from the Liggett and Myers Tobacco Factory to the northwest boundary of the city. The community is built on two ridges separated by a small stream. Although there is some relatively level land near the ridge tops, most of the area has gently rolling topography which provides attractive home sites. On the east and northeast it is bordered by low and unpopulated land and to the north and northwest lies open country occupied mostly by

farms. On the south, there is the East Campus of Duke University, the mill village of West Durham and a negro settlement known as Hickstown near the city boundary, all facing the Southern Railway. Near the center is Watts Hospital and another negro settlement along the stream which separates the two main ridges.

Culturally it is a community of many contrasts, with homes sheltering almost every stratum of society; but on the whole it probably should be rated above any other middle-class community in the city and from the number and quality of new homes constructed in the area it seems as if Durham people recognize its superiority in the middle-class field. It apparently owes its superiority to Watts Hospital, the East Campus of Duke University, and its position in the northwestern part of the city, a location traditionally popular in most North Carolina cities. At the top of the scale are the business and professional people who live near Watts Hospital and Duke University Campus. In contrast there are the cheap homes near the factories in the southeast, the mill village of West Durham, and the negro communities in the center between the ridges and along the railroad tracks in the west.

e. Southwest Durham: Basically the southwest portion of the city is another transverse ridge along the crest of which a major thoroughfare passes on its way to Chapel Hill. The pattern of settlement here, however, is more disconnected than in any other major middle class white community in the city. White settlement begins at the edge of the business district, spreads out on both sides of Chapel Hill Street and extends out secondary ridges toward Forest Hills on the south and Duke University on the west, and then comes to a sudden stop near Maplewood Cemetery. The land to the north, east, and south of the Cemetery is occupied by negroes, but beyond, along Chapel Hill Road, white residences again appear in a small community known as Lakewood.

Like northwest Durham it is an area of contrasts with some advantages and some serious handicaps as a residential area. Doubtless Duke University on the west, Forest Hills to the south and the wealth of Morehead Hill at the southeast have helped sustain the community, but negro settlements in the center are a retarding influence and there are blighted areas in the east near the factories and in the north adjacent to the railroad.

f. Minor Areas: Most of the middle class white people of Durham are

FIGURE 11.—An average negro residential street. The middle-grade negro districts are generally of the poorer cottage type, built of wood, unpainted, and on pillars without underpinning, and in the main, are located on unpaved streets.

located in the five major sections discussed above, but there are about a half-dozen lesser areas scattered in various parts of town. Some are isolated units while others are associated either with high-grade or low-grade communities. One isolated unit is a housing project built recently on a low divide north of Ellerby Creek in the northern sector of the city and the other is an island of white people surrounded by negroes on Alston Avenue in southeast Durham. The Alston Avenue settlement is remnant of a former larger white community that is gradually being absorbed by negroes. They have pushed in from all sides except the side facing the open country, leaving the white people along the ridge top.

The remaining middle class white areas in the city are parts of larger communities. A small area on the southern edge of Forest Hills should be rated a little above the ordinary middle class community. Two small areas north of the business section are pockets of good communities that have become isolated by the intrusion of business on one side and negroes on the other. Two small areas in mill communities, one in East Durham and the other in West Durham, appear to have been established by some early citizens or by mill officials.

## Mill Villages and Transitional Areas

The low-grade residential districts of Durham fall primarily into two groups, the mill villages and the unstable transitional zones. The first group is larger and although once isolated in the mill villages of East Durham and West Durham, is now surrounded by, and included in, the city. The mill section in East Durham is the older of the two and is actually two villages. The older East Durham grew up on both sides of the railroad around the early cotton mills and lies south of the middle-class community of East Durham previously discussed in this paper. The western part of the mill community developed closer to the business district around the Golden Belt Manufacturing Company and is known as Edgemont. Both Edgemont and the older East Durham are among the poorest white communities in Durham. Many of the homes are in a poor state of repair, in many places there is congestion, and in other places slum conditions prevail (Figure 8).

The village of West Durham owes its origin to the Erwin Mills located on the railroad in the western part of the city. The community is newer than the mill village of East Durham and

Figure 12.—Negro slums occupying bottom lands. The houses are delapidated and ill-kept, crowded close together, often between factories and warehouses along freight yards and back alleys. Such squalid negro districts are found in many parts of the city.

although homes are cheaply constructed they are well spaced and generally in good repair (Figure 9). Rents are low, ground is often provided for gardens, and an atmosphere of comparative well-being generally prevails.

There are nearly a dozen low-grade white transitional zones in the city. They are small areas, generally located in the older part of the city, which act as buffers between areas of conflicting land use. In this role they fill the gap between the better grade white communities and such detractive cultural features as railroad tracks, industrial plants and negro slum districts.

### NEGRO RESIDENTIAL AREAS

The domain of the negro is a community known as Hayti in southeast Durham, south of the Southern Railroad and east of the railroad spur that leads to the American Tobacco Factory (Figure 3). Although the colored man is found in many pockets in almost all parts of the city, Hayti is the chief center of his social, business, and institutional life. We have seen that in the early days most of the negro houses were built on low ground behind the homes of the white people, but as the city grew demand for the negroes in the tobacco factories and as common laborers became so great that there was not room for all of them in the hollows. Gradually they pushed up the slopes of southeast Durham, eventually crowding out the whites completely in this part of the city.

Negroes who have attained positions of prominence in the business, professional, and social life of their race have created for themselves a rather selective community on the crest of a ridge in the heart of the southeastern part of the city. They occupy most of Fayetteville Street south of the negro business district, the east facing slopes between the Lincoln Hospital and the North Carolina College for Negroes and a few blocks that lie just west of the college campus. Though not mansions, homes in the area compare very favorably with a good average white community in a southern city (Figure 10).

Middle-class negro residences are in widely separated parts of the city, all of them some distance from the business district. The largest concentration is in the southeast on the rolling and well-drained land around and beyond the high-grade negro section. Another community known as East End is located northeast of the business district on a low ridge between two streams. A settlement known as Walltown has developed in Northwest Durham along the stream that nearly severs that section. Another settlement occupies the better drained land around Maplewood Cemetery in the southwestern part of the city.

The middle-grade negro districts are generally of the poorer cottage type and in the main are located on unpaved streets (Figure 11). Most of the houses are wooden structures, some are unpainted, and many are built on pillars without underpinning. In places attempts are made at providing shrubbery and sometimes there are lawns and gardens. Such homes are occupied by comparatively well paid factory workers, but the rate of tenancy is rather high.

Low quality negro houses are located in many parts of Durham. They are commonly located on low ground and almost every valley if occupied at all, has its ill-kept negro homes. The negro poor are also found along freight yards and back alleys and interspersed between factories and warehouses. Relatively few white homes in the city are beyond walking distance from a cluster

of negro homes. It was a convenient arrangement in the early days when transportation was poor and space was plentiful. As the white man moved out along the ridges he was willing enough to have the negro, who worked in his factory or around his house, follow him and occupy the space along the back alley, in the hollow below (Figure 12) or across the railroad track. Although squalid negro homes are found in many sections, larger concentrations outside their major district are in the low pockets north and east of the business district and adjacent to the railroad yards and streams in the southeast.

### Suburban Areas

Although many people who work in Durham live outside the city along major highways or near them, closely built suburban areas are small. The Bragtown area on and near the Roxboro Road north of the city is one of the largest. Another area lies southwest of the city along the Chapel Hill Road and in the Hope Valley Country Club District. Several Duke University professors recently have built in the forest near the West Campus. The Forest Hills section in the southern part of the city is continued outside in a small area known as Rockwood. Elsewhere, as the culture map shows (Figure 3), the population thins out before the city boundary is reached except for the negro section, which continues some distance into the country along the Fayetteville Road. Generally the outlying areas, including the negro districts, contain good quality residences; the Hope Valley and Duke Forest areas may be considered high grade.

# NEW ZEALAND: MARKETING A PASTORAL SURPLUS

*Irene A. Moke*

NEW ZEALAND, major South Pacific outpost of the British Commonwealth of Nations, holds an important position as one of the major sources of food for the world, as well as of the textile raw material, wool. The area of the island is modest. North Island, South Island, and the smaller Stewart Island have a combined area of 103,416 square miles, slightly smaller than the Japanese islands and approximately equal to that of the State of Colorado. Population density is low—by the latest census (1945) there were less than two million people, about 20 to the square mile. Favorable natural conditions combined with low population density have promoted growth of one of the world's great pastoral industries.

A major factor promoting New Zealand's pastoral attainments is abundance of good pasture lands, both natural and sown, and a most favorable climate. The islands, generally speaking, have marine climate, with marked tendencies towards a subtropical phase in northern reaches. Thus they are free from extreme temperature ranges and for the most part are well-watered, with rains fairly well distributed through the seasons, though with a winter maximum in the north. In South Island where the impressive Southern Alps form a rain divide, the natural prevalence of heavier rains on the west coasts is pronounced, and they are rain-drenched and sparsely settled. On leeward sides of the mountains, hill slopes eastward with 20 to 30 inches of rain, support extensive natural pastures. In North Island the central plateau area does not form so decided a rain divide and precipitation over the entire island is more evenly distributed. Major development of sown pastures characterizes North Island where natural forest and burnt-over scrub have been converted into permanent or long-term grasslands (Figure 1). Sown pastures are also found in the better watered areas of South Island, though not so extensively. In North Island, pastures provide forage all year around, although some supplementary feeding is necessary. In South Island pastures may be relied upon for feed only during nine or ten months of the year, and supplementary feeding increases. The equable climate precludes necessity for winter housing in either island.

Statistics of land use in New Zealand serve to emphasize the vital share claimed by pastoral industries in the Dominion's economy. The land area is approximately 66½ million acres. Only 43 million acres outside the cities are classed as "occupied land." The remainder is unsettled chiefly because of natural handicaps. Considerable portion comprises plateau-land and mountain ranges which contribute greatly to the beauty and tourist appeal of the country but are sparsely settled. Occupied land lies east and south of the mountains in South Island, and in North Island forms an irregular circle about the lightly-settled central plateaus. Of the 43 million acres comprising the occupied territory, 32 million or around 73 per cent are in pasture, either native or planted (Figure 2). Less than 2 million acres, or just about 3 per cent of the occupied area is nor-

mally under field crops; it is significant that root and hay crops for animal feeding usually comprise nearly 70 per cent of the total field-crop area.

The number of cattle and sheep is far larger than the human population in New Zealand. As of the latest census date (September, 1945), there were 1,702,298 people. As of early 1946, the closest date for comparison, there were nearly 5 million cattle, of which one and two-thirds million were dairy cows. Sheep numbered over 33 millions (Figure 3).

With a small human population and a large animal industry, New Zealand has become one of the world's leading exporters of animal products. Although the Dominion's relative position is subject to change from year to year, New Zealand averages first in the world as an exporter of cheese and of mutton and lamb, second only to Denmark as an exporter of butter, third in wool exports, and fifth in beef and veal exports. The country is lower in rank but still important as exporter of pork products and of casein and condensed, evaporated, and dried milk.

It is important to emphasize the vital part played in the national economy of New Zealand by its animal industries. The prosperity of the country depends upon successful marketing abroad of the surpluses of its dairy and grazing activities. Study of annual value of all production in the Dominion reveals that about 60 per cent of the total value is contributed by agricultural, pastoral, and dairying activities. Pastoral and dairy industries alone supply somewhat over 50 per cent of the total. The predominance is further revealed in export statistics. From 1921 to 1946, the percentage by value contributed to New Zealand's total exports by the animal industries was never less than 90 per cent, and at times was nearly 95 per cent. Of course, this includes processed foods such as butter (Figure 4).

Clearly, New Zealand is a specialized producer. At present there would be nothing much to which the country could turn for purchasing power abroad and for credits to apply on debts if the animal industries should fail her. Field crops supply no more than a tiny fraction of the export value. Manufactured articles are almost negligible in the export trade—they constitute major imports. Anyone inclined to question the situation may well inquire as to the

FIGURE 1.—Sown pasture, Hawkes Bay, North Island. Permanent or long-rotation sown pastures on cultivated and uncultivated land cover approximately 12 million acres in North Island.

possibility and desirability of changing the picture. From one point of view, there seems to be a valid economic argument against change, as New Zealand is exceedingly efficient as a pastoral producer, and in a well-managed world economy should continue to do what it does best. However, with ever-present uncertainties of world markets and lack of integrated world-production program, admittedly New Zealand might again find itself, as it has before, in the dangerous position of one to whom the road to security is blocked, with no detour in sight. With such danger in mind New Zealanders have become interested in other lines of production, particularly secondary industries, to which the recent war gave impetus. However, it must

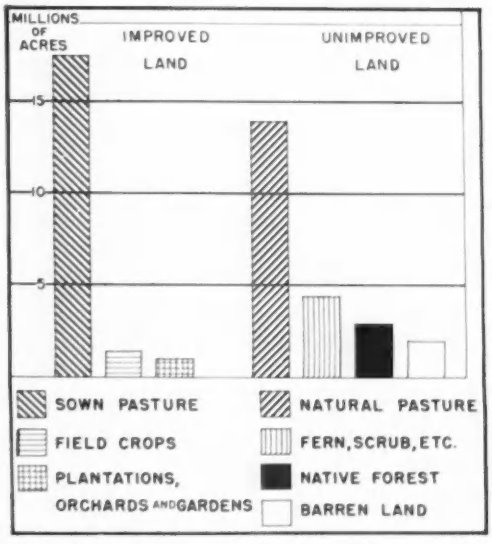



FIGURE 2.—Use of the occupied land, New Zealand. Source of statistics: *Farming in New Zealand*, Bulletin No. 252, New Zealand Department of Agriculture, Wellington, New Zealand, 1946.

candidly be admitted that secondary industries have developed under heavy tariff protection and at high cost to the consumer in hidden taxes. At present encouragement of manufacturing industries by the Government is defensible from the standpoint of providing full employment. In time certain industries well adapted to use of domestic resources should achieve more economic production and two things may be accomplished, (1) New Zealand may become less dependent on imports, and (2) manufacturing industries may be able to furnish export articles. Obviously, such a program postulates long-range development in which the entire economic structure of New Zealand would change.

We return then to the thesis that New Zealand will remain for many years a surplus producer of pastoral products, which must be sold to buy needed manufactured items and supplementary articles of diet and to supply credits for overseas debts. The Dominion's chief interest must lie in development of a program designed to resolve, in so far as possible, problems attendant upon such a situation.

New Zealand is a young nation, politically—in 1940 just 100 years old. For many years foremost concern of the people lay in increasing production. It is only during fairly recent years that emphasis has switched to concern over marketing increasing surpluses. The concern began to take active form in the 1920's and became fully defined in the difficult years following 1929. It has developed along two major lines, (1) the struggle to gain a position of tariff preference on the United Kingdom market, and (2) the evolution of marketing control by the Government.

The depression following 1929 closed some of New Zealand's markets as tariffs rose and countries adopted more and more measures designed to protect their own producers and to restrict imports. The effect of the various governmental policies was felt not only by New Zealand and other dominions but also by the mother country, as Britain's "free trade" policy encouraged

entry into that country of products from the continent and from other regions as well as from the Empire. The cumulative result constituted serious hazard to New Zealand's major export outlet.

The United Kingdom, as a deficit area in dairy and meat products, as a great wool-manufacturing country, and as the mother nation—"Home" to the New Zealanders—had always been the Dominion's chief market. It had also been the major source of imports. Moved certainly by a feeling of close personal relationship as well as by economic considerations, the New Zealanders from the beginning of the 20th century had a definite program of preference through tariff rates for products from the United Kingdom. Britain, however, failed to make any important reciprocal arrangements until the grave world situation previously noted led to consolidation of Empire forces culminating in the Ottawa Agreements following the Ottawa Conference of 1932. At that time the United Kingdom formally agreed to a tariff preference system on a reciprocal basis effective throughout the Empire. In the closing months of 1931, immediately preceding the formal conference, and in the months and years following, Britain arranged tariffs to grant considerable margin of preference to Empire products, and also imposed import quotas on key items, with the right reserved to extend the quota system to affect the Dominions, although on a basis which would continue sizable imports from Empire members. Without the quota system, Imperial Preference would have been less effective than it proved to be. "Preference" has come to imply, in many minds, not only tariff discriminations but also accompanying quantitative restrictions on imports.

To some extent establishment of Imperial Preference intensified trade relationships already existing (Table I). That changes made were not greater is largely attributable to the fact that various members of the Empire, exclusive of the United Kingdom, had already made some reciprocal agreements. Thus for New Zealand the greater importance of Preference comparatively assured continuance of established markets, rather than any great increase in percentage of sales to the United Kingdom. Figures on export trade after 1931 show, item by item, a stabilization of the percentage taken by the United Kingdom, instead of the former sometimes pronounced fluctuations from year to year. Wool is an exception, for wool has a much broader sales-range than other commodities.

Government supervision of marketing in New Zealand has developed more or

TABLE I

NEW ZEALAND: PERCENTAGE DISTRIBUTION OF FOREIGN TRADE BY MAJOR COUNTRIES. AVERAGES FOR 1923–1930 AND FOR 1931–1938

| *Country* | *Per Cent Taken of Total Exports* | | *Per Cent Supplied of Total Imports* | |
|---|---|---|---|---|
| | 1923–1930 | 1931–1938 | 1923–1930 | 1931–1938 |
| United Kingdom | 77.5 | 83.5 | 47.9 | 50.0 |
| All British countries | 87.5 | 89.4 | 70.3 | 72.7 |
| United States | 6.8 | 3.9 | 17.8 | 13.0 |

Source of statistics from which averages were compiled: *New Zealand Official Yearbook*, Census and Statistics Department, Wellington, New Zealand.

less concurrently with the struggle for reciprocal preferential tariffs. The Government entered marketing in World War I, but purely as a temporary measure. During the 1920's the "orderly marketing" of primary products became part of Government policy but the Government exercised its powers with restraint. However, shortly after conclusion of the Ottawa Agreements it became apparent that drastic measures were needed to save the dairy industry. Empire Preference failed to safeguard against wildly fluctuating prices to which the dairy industry was particularly susceptible, and the severe agricultural depression of the middle thirties hit New Zealand full force. Primary producers wished cushioning against falling prices, and were ready to yield to the Government the problem of disposal of surpluses.

The clear definition of the policy of Government marketing came in 1936 with the passage of the Primary Products Marketing Act, now known as the Marketing Act. The Act specifically referred to dairy products but was so worded that its provisions could apply to any and all primary products. It stated the aim as being adequate return to producers to compensate for their services to the community, and included provisions for Government acquisition of primary products, for price fixing, and for Government-managed marketing. Aimed particularly at the export trade, it nevertheless also carried provisions for domestic marketing controls. During early operation fixed guaranteed

FIGURE 3.—Merino sheep being driven to shearing sheds, Marlborough, South Island. Most Dominion sheep are Crossbreds. There are less than one million Merinos, found chiefly in the South Island. The pictured hill slopes carry natural tussock pasture.

prices were met by Government subsidies to producers, but shortly after its inception prices began to rise, and the program during the past ten years has been carried out under favorable conditions of world prices. Therefore the Government has been reasonably successful in its goal of establishing "stabilization accounts" built up by withholding part of the amounts received in excess of the minimum judged necessary for a reasonable return to producers.

During World War II the New Zealand Government undertook marketing of all major primary products under powers of the Marketing Act. Perhaps the most significant war development was contracting bulk-purchase arrangements. The contracts, between the Governments of the United Kingdom and New Zealand, covered sale to the United Kingdom of exportable surpluses of meat, butter, cheese, and wool on a long-term basis, and, on annual basis, of hides, wooly sheepskins, fruit, eggs, and tallow. The guaranteed price was applied to all such products, and the contracts covered the price question with provision for revisions annually or when demanded by world conditions. It is only natural that New Zealanders should favor such contracts, and it is not surprising that they failed to end with close of the war. Britain's need for food on the one hand and New Zealand's desire for assured markets on the other have worked mutually. The result has been an extension to 1950 of contracts for butter, cheese, and meat, with possible extensions to 1952 in mind. Certain other items, such as dried or canned milk products, are contracted for annually. Disposal of wool surpluses at guaranteed prices has been undertaken by a joint organization involving the countries of South Africa, Australia, New Zealand, and the United Kingdom, rather than by bulk-purchase contracts.

The significance to world trade relations of the continuance of bulk purchasing should be apparent. Contracts in effect constitute state trading, which is regarded as opposing to free world development of multilateral trade. To New Zealand, however, they probably appear simply as a contractual formalization and securement of a situation long in existence, for it must be remembered that the United Kingdom has always been New Zealand's best market. Whether the practice of making long-term bulk-purchase contracts will continue indefinitely is a question. New Zealand was only one of a number of countries which used this purchase-and-sell method during the war. As a war measure it was efficient and probably necessary. In peace, under the proposed international trade charter, it is considered undesirable. Its continued use by a few leading exporting and importing nations might of necessity lead to revision of ideas regarding the most feasible method of organizing international trade. (There are already numerous advocates of the scheme of organizing international trade on a commodity basis, with separate negotiations and agreements for each major commodity. The argument is that certain key items can be handled satisfactorily in no other way. The system under favor at present is one which aims at a charter setting forth general principles to be followed by all participating countries, with commodity settlements merged into the over-all tariff policy.)

In New Zealand, Government marketing of agricultural exports has been accompanied by control of exports through licensing, and, inevitably, in an effort to direct expenditure of moneys obtained through exports and to con-

serve dollar exchange, export control is supplemented by licensing of imports. All such factors concomitant to Government marketing were in effect before beginning of the war.

The basic, dynamic force behind developments of the past two decades, it must be clear, has been desire for stable economy in a country which depends upon world markets for domestic prosperity. Future developments in New Zealand will be guided

FIGURE 4.—A typical dairy factory, Taranaki, North Island. There are about 400 butter, cheese, or dual-operation dairy factories in the islands, three-fourths of them in the North Island.

by the same desire as long as the country remains on a pastoral-export basis. As previously indicated, industrial development has barely begun in New Zealand. In the present period of readjustment after the war and for years to come, the mainstay of New Zealand's economy is and will be pastoral, and with only a normal increase in population, export trade must continue to be of paramount significance. The peak of pastoral production is probably yet to come, moreover, improvement of pastures would bring greater returns—some permanent sown pastures, especially in the North Island, have been allowed to deteriorate. Further, there are still some pasture areas unused, though such regions are not extensive. Also, the output of pork and of beef could be stepped up if the market justified such an expansion. Hog and beef cattle production in New Zealand has never received concentrated attention, the animals often being raised merely as conveniences in conjunction with sheep-ranching and dairy-farming.

The question arises as to whether New Zealand will continue along the lines of its present policy of preferential tariffs and Government control of marketing, with accompanying features of currency control, guaranteed prices, import-export licensing, and bulk-purchase contracts. There is every indication at present that it intends to retain many of the practices for an indefinite period. (The picture could change with the coming into power of the Opposition, of course, but it is notable that foreshadowings of the general policy now in operation were present even before 1935 when the Labour Party came into office. A switch of the party in power would probably bring changes in degree rather than in direction. Moreover, Labour was returned to office in the recent election (1946) and thus will negotiate any trade pacts in the next three years.) Recent statements of Government policy stress development of resources, full employment, security and stability of export trade, and control of imports with the purpose of regulating expenditure of overseas funds.

It is true that New Zealanders are not of one mind as to how objectives of stability, security, and full employ-

ment may best be attained. There is increasing evidence of agitation for more producer participation in marketing and, most particularly, in disposition of funds deposited in the stabilization accounts. As yet, however, there is no indication that producers desire return of marketing to private enterprise alone —the guaranteed price scheme is a great inducement in favor of continued Government direction of the marketing policy. Full employment, moreover, is a powerful argument in favor of continued encouragement of secondary industries, with accompaniment of tariff and import restrictions.

Regarding the issue relative to the system of preferential tariffs, the New Zealand attitude can be described only as cautious. Empire Preference in itself is not the solution to New Zealand's marketing problems, as has been proved. Also, the New Zealanders would like broader trade horizons. The British market does not give promise of any great increase in demand. The New Zealanders are acutely conscious, moreover, of the dangers inherent in such heavy reliance upon one purchaser. The Dominion is unwilling to let preference go, however, until it has a more than fair assurance of friendly reception on new markets. Lately, Imperial Preference has emerged as one of the major elements of bargaining power in international trade discussions. The Dominion, in common with other members of the British Empire, has hinted that if preference is to go there must be substantial concessions from other countries to take its place. It is likely that the same reservations apply to the question of relinquishing or modifying the practice of bulk-purchasing.

The New Zealand system of marketing has certain outstanding disadvantages. One is hazardous reliance on a single chief buyer, just noted. A second disadvantage arises from the very nature of the country's economy, with its heavy dependence upon pastoral pursuits for exports. The agricultural policy of marketing under guaranteed minimum prices while also building up stabilization funds for use during periods of low prices unfortunately can be maintained only at expense of the very industry which it seeks to stabilize. That is, the pastoral industry furnishes its own stabilization funds. In case of critical need, financial transfusions must come from a "blood bank" furnished by the patient under treatment. Inevitably, the situation leads to conjecture as to the steps which would be taken if prices began to fall rapidly. Stabilization funds now established could not stand any long run on the bank.

In a balanced and planned world economy, with nationalism subordinated and with each country producing what it can produce most efficiently, New Zealand could occupy a secure position as one of the world's leading sources of food products. New Zealanders hope for an organized program of world trade, based on a full employment and trade-expansion policy. In such a plan the British Commonwealth of Nations would retain some of its family relationships but would coöperate with other nations of the world to encourage equitable distribution of commodities. A corollary of such a program would be provision for concerted world coöperation in case of depression. The general view seems to be, however, that such a goal, if achieved, will be reached only by stages and may be long in arriving. In the meantime New Zealand, in common with other nations, may cling to devices recognized as basically unsatisfactory, but which seem to hold at least a measure of security for the vitally important export trade.

# A PROGRAM FOR STABILIZING THE FISHERY OF WASHINGTON

*Tim K. Kelley*

THE fisheries of Washington, fourth in value among resource industries, contribute an important part to the economy of the state. The 1942 production, valued at $16,000,000, placed Washington third to California first, and Massachusetts second, in value of product landed. Since statehood in 1889, 2,503,816,000 pounds of fish valued at $126,750,000 have entered Washington ports from territorial waters. The primary value of fresh fish when finally canned, mild cured, smoked, kippered, quick-frozen, filleted, or otherwise packaged and prepared for market may be increased several fold. Consequently, the industry supports directly or indirectly, a far wider range of administrators and wage earners than is covered by the 9,543 employees listed in statistical summaries. In addition, Washington has almost a proprietary interest in the Alaskan catch, as 75 per cent of the 25,000 fishermen and cannery workers employed in the northern territory are residents of Washington. The monetary and employment value, plus food properties and recreational appeal, make the fisheries worth whatever effort is necessary to maintain a high productive level. Like other forms of natural wealth, the fisheries inheritance has been misused.

Though fisheries of the United States are perhaps the most poorly managed of our natural resources, it is, however, not true of Washington for State, Federal, and International agencies have united to develop a program of conservation, second only to that of California. Despite it, serious depletion in several fisheries, e.g. crab, shrimp, tuna, sole and flounder, and salmon, have resulted due to, (1) the increased operating radius of fishing boats, (2) the use of more efficient gear, and (3) continual encroachments on the natural habitat of anadromous species through their successive stages of development.

In its earlier development the fishing industry was largely centered on two species, salmon and halibut. The two are still of high significance, but the trend is toward diversification. The catch now includes 35 species, several of which can no longer be considered minor. Certainly oyster culture is not; neither is shark, crab, tuna, or the bottom fish. In the future, other varieties now virtually unknown and unvalued may enter the market, as tuna did nine years ago, and the soupfin shark even more recently.

With diversification in production there has come even greater diversity in fishery problems, both scientific and economic. Each fishery obviously has its own methods and problems, many of which are already being solved, either within the industry itself or by investigational work by one of the conservational agencies; yet much remains to be done. It may well be, therefore, that there is place for a comprehensive overall program in the State of Washington which can serve as a future objective. Such a program, broad in its scope but practical enough for general application, with an ultimate goal of making the fisheries one of the state's permanent assets, follows.

## The Nine Point Program

1. *An Expanded Educational Program for the State.* Many citizens are still unaware of the necessity for regulation of certain state fisheries in order to achieve permanent production. Regulation is probably one of the most unpopular words in the lexicon of the average person but rehabilitation depends upon public willingness to accept regulation as well as upon guidance by trained fishery personnel. If a choice must be made between unrestricted fishing, which will eventually impoverish or exterminate a species, and the promulgation of a set of restrictions which will enable it to be sustained at a profitable level, there should be no hesitation. Greater emphasis should be placed on conservation in the public schools instead of with sportsmen groups where such a program is already in favor. Press and radio should be employed to educate the public and to seek its aid in preserving the fisheries.

2. *Increased Biological and Technological Research.* The agencies for such research now exist and have done yeoman work. There should be, however, popular recognition, gained through the educational program, of the need for increased appropriations so that lesser known species can be studied and this knowledge added to the scientific information thus far accumulated. Without such research it is impossible to enact legislation or set up the proper measures for future fisheries improvement.

3. *Recognition of the "Conflict of Interests" Principle.* Modern development is a constant succession of conflicts between two or more industries, each claiming precedence and frequently eliminating its rival. When a power dam such as Bonneville or Grand Coulee is built, the destruction of salmon runs on the Columbia River follow inevitably. A pulp mill at the mouth of any stream may damage anadromous runs or oyster beds. Constant diversion of water for irrigation districts may draw off fingerlings as well as render spawning beds useless. Growth of cities with their factories and their sewage disposal problems also come within scope of the principle.

Figure 1.—Screened Irrigation Diversion. Since irrigation became general in Eastern Washington, losses as great as 50 per cent have resulted among the downstream migrant salmon fingerling. Only a small part of the State's 944 diversions are now protected.

Washington has already experienced hundreds of such conflicts, many of them inevitable. It is necessary, however, that clear and fair appraisal be made in each case of rival industries and the utmost possible be done either through compromise or by means of protective legislation so that neither industry suffers permanent or irreparable damage. Pollution control is obviously a recognition of the principle.

4. *Artificial Propagation, When Feasible.* As has already been discovered in the case of numerous salmon streams, hatcheries can go far toward replenishing part of the damage done either by unrestrained fishing with an impaired escapement or by conflict of interests previously mentioned. Further hatchery expansion seems definitely desirable. It is still an open question whether hatcheries can do much to propagate other oceanic types of fish.

FIGURE 2.—Fish Ladder in Wenatchee River. Due to conflicts of interests among water users, many hazards now confront the upstream migrants. Such fishways, as the above, aid the anadromous species in reaching their spawning grounds.

5. *International Coöperation and Regulation.* Washington is one of the successful pioneers in the field of international coöperation and has reaped very high benefits through its participation in the International Fisheries Commission, set up by the United States and Canada. The international control of halibut has now been followed by a second convention, aimed at rehabilitation of the sockeye salmon run. The International Pacific Salmon Fisheries Commission has begun its work, particularly on the Fraser River, and should eventually stabilize this valuable resource. Such measures for salmon and halibut should be followed by additional international legislation as, for instance, in otter trawling and perhaps the seining of pilchard, which cross international borders.

6. *Interstate Coöperation and Regulation.* Rivers, such as the Columbia, are interstate and international. At present widely diverse legislation concerning Columbia River operations has been passed in Washington, Oregon, and Idaho which make concerted conservatory practices impossible. The Columbia should obviously be under uniform legislation regardless of state boundaries. It may perhaps be necessary to establish a Columbia River Authority with complete jurisdiction over fishing matters.

7. *Jurisdiction Over the Continental Shelf.* A three-mile or even a twelve-mile limit is now untenable as a practical principle applied to fishing grounds. It is unthinkable that any state which regulated its fisheries and its fishermen in order to attain permanent abundance, should permit invasion of its coastal waters by outside interests. Consequently, a policy of full national jurisdiction over fishing waters of the continental shelf is the only sensible policy for a state such as Washington. President Truman's proclamation of September 28, 1945 claiming control over areas contiguous to the coasts of the United States wherein fishing activities have been or may in the future be developed, is a forward step toward such a program.

8. *Revision of Indian Treaties.* Under certain ancient treaties, groups of In-

dians have been permitted to carry on fishing not only for subsistance but also unrestricted commercial fishing. The volume of fish so caught has grown in recent years to a surprising proportion of the total catch taken in waters of the state. For the five years of 1935 to 1939 inclusive, the known commercial catch of salmon and steelhead by Indians amounted to 21,780,869 pounds. Because a majority of Indian Reservations and "accustomed fishing sites" are located on spawning streams, the degree per cent thus endangering success of the Columbia River rehabilitation program carried on by the Fish and Wildlife Service. Indian fishing privileges, exempt from closed seasons and other methods of control, are threatening salmon runs and the industry. The treaty makers of 1855 could not have foreseen conditions of the 1940's, and dangers arising from such policy, short sighted to white and Indian fisherman alike. Revision of such treaties is vital.

9. *Marketing of Lesser Known Food Fish.* Increase in varieties of fish landed in Washington, particularly since the otter trawl became standard equipment, has resulted in accumulation of many types of excellent food fish generally unknown to the public. Recognizing the situation, the rockfish industry is now raising a fund to widen the sale of this palatable but relatively little known

Figure 3.—Indians Dip-Netting at Celilo Falls on the Columbia River. It is at such "accustomed fishing sites" that unrestricted fishing by Indian fishermen is threatening vital escapements of salmon and steelhead. Such procedures are largely nullifying measures designed to provide a sustained yield.

to which vital escapements are affected is of real significance. Increased restrictions on the white man's commercial operations simply mean increased Indian catches. Statistics indicate that the Indians have taken 38 per cent of the annual Bonneville escapement since installation of fish ladders in 1933. Some years the figure has been as high as 65

fish. Similar methods should be employed in marketing other species in order that the strain on the better known and more widely utilized varieties be partly alleviated.

The obvious goal of the program, and of all state endeavor, should be development and utilization of every type of available underwater life useful for food or raw material. Without systematic planning, and firm use of every available agency, it may be difficult to make the fishing business one of the state's permanent assets.

# INDUSTRIES OF THE HINTERLAND OF BRISTOL

*Frank Walker*

THE five counties of Gloucestershire, Somerset, Wiltshire, Devon and Cornwall form the larger hinterland of the port of Bristol and although some of the special commodities like bananas and non-ferrous metal ores which are imported through Bristol are distributed over a much wider field, yet, in the main, it is the economic geography of these five counties which determines the nature of the port's import trade. Similarly the absence of heavy industries in these Western counties and the peculiar nature of Bristol's own industries (see "The Industries of Bristol," ECONOMIC GEOGRAPHY, Vol. XXII, No. 3) has been largely responsible for the almost complete absence of an export trade (see "The Port of Bristol," ECONOMIC GEOGRAPHY, Vol. XV, No. 2) through the port, since only a negligible part of the industrial output of the Midlands is exported through Bristol and in the region immediately surrounding the port there have been in the past no industries producing great quantities of material for export.

## FOOD PROCESSING

Basically the five counties are all agricultural areas and in the period before the wartime redistribution of industry in Britain and the development of dispersal in the organisation of the rearmament programme the preeminence of agricultural occupations in this area is shown by the fact that the percentage of actual adult workers engaged in agriculture were as follows:

| | |
|---|---|
| Gloucestershire | 14% |
| Wiltshire | 15% |
| Somerset | 16.5% |
| Devon | 19.5% |
| Cornwall | 20% |

so that, in each case, agriculture was by far the most important single occupation. In Gloucestershire, except in parts of the vale, agriculture is essentially mixed in character with a very high proportion of the land in arable use, but throughout the rest of the region the agricultural technique in normal times is based almost entirely on animal husbandry and results in much of the land being maintained as permanent grassland or being left in very long grass leys in the rotation system. Moreover except in the more isolated parts of North Cornwall and the upland parts of Devon the objective of the animal husbandry is the production of milk either for the liquid milk market or for local processing. In consequence, particularly where the milk is destined for the liquid milk market and it is desirable to avoid large seasonal fluctuations of supply, great quantities of grain and oil-cake supplementary feeding stuffs are consumed and it is therefore natural that grain and oil-seeds for this purpose figure largely in the imports of Bristol and their milling and manufacture forms an important trade in that city.

As far as the output of liquid milk is concerned, however, this region is in a sense completely outside the orbit of Bristol, for although the local district does supply Bristol's requirements, the greater part of the output, particularly of Wiltshire and Somerset, is sent direct to the London market. This collection and transport of liquid milk is now almost entirely in the hands of large dairy organisations, such as the United Dairies, who have collecting and processing plants near Tiverton,

Melksham and Wootton Bassett, Messrs Nestle's at Trowbridge, Chippenham, Salisbury and in Cornwall and the Cow and Gate company at Somerton and Wincanton, and throughout the counties of Somerset and Wiltshire three quarters of the total production normally goes to large depots or condensing plants. Individual processing plants have a considerable output capacity and in the season of maximum production the two large Nestle plants at Staverton (near Trowbridge) and Chippenham, for example, each handle some 35,000 gallons of milk daily. Their output consists of various types of condensed, evaporated and dried milk and baby foods, as well as butter and homogenised tinned vegetables at a third factory near Salisbury. It is interesting to note that the huge consumption of tinned containers for these products, amounting to several millions annually are manufactured at the plants themselves, using large quantities of tinplate brought from South Wales through Bristol. The canned products of this industry are distributed easily by road or rail throughout the country, but until recently the large scale long distance transport of liquid milk to the London market was only possible by virtue of the high speed direct rail links with London by the Great Western and Southern Railways and the collecting centres are all close to main line connections. The only notable exception to this arrangement is in the milk producing area of the vale of Gloucestershire where the rail pattern along the Bristol-Derby

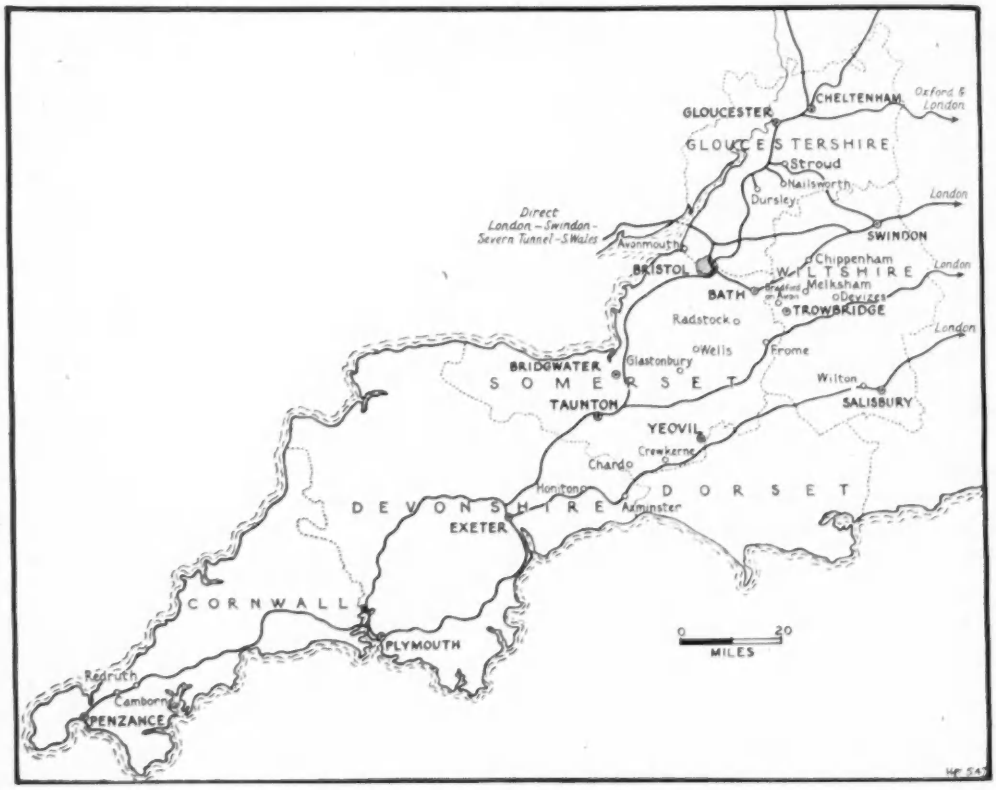



FIGURE 1.—The five counties that constitute the Hinterland of Bristol—Gloucestershire, Wiltshire, Somersetshire, Dorsetshire, and Devonshire, with some slight contribution from Cornwall.

main line of the L.M.S. railway links this region with Birmingham rather than the London region and here there has been established a milk processing plant at Frampton-on-Severn which supplies a good deal of the milk needed by Messrs Cadbury's chocolate factory near Birmingham.

Where the milk is processed for the production of cheese and butter there is less tendency for this region to become tributary to the London area and the whole process may be carried out locally. Much of this was formerly a small scale farm-house industry, but it is now being taken over more and more by large firms like the Diploma Cheese Company at Wells and Messrs Aplin and Barrett of Yeovil who have collecting centres throughout the region and produce at their factory almost every kind of dairy product as well as processed meat products, based on local supplies. On the other hand plants have been established in the Western Counties for the collection and partial processing of milk for firms whose factories are situated near London, the Kraft Cheese Company having a centre at Ilminster whilst their main plant is on the Western outskirts of London alongside the main Great Western railway line to the West of England at Hayes, whilst Nestle's chocolate factory is similarly situated and also draws part of its supplies from their plants in the West of England.

The occasional availability of surplus milk in normal times and the large quantities of skimmed milk as residual products of the processing plants has meant that pig-keeping has been an associated occupation in this region particularly in the Counties of Somerset and Wiltshire, so that the curing of bacon and the cooking and preparation of other pork products on a factory scale has become an important local industrial resource. One of the largest and best known of these concerns is Messrs Harris's of Calne, Wiltshire, who manufacture most types of pork product and bacon and the same applies to a number of firms in Bath, but in addition bacon is cured by the Central Wiltshire Bacon Company at Devizes, the Wiltshire Bacon Company at Chippenham, the Somerset Bacon Company at Bruton and at Highbridge and the Co-operative Wholesale Society at Shepton-Mallet.

If, in order to exclude the small firms catering solely for local needs, one considers only firms employing more than 50 persons the normal figures for employment in these food processing industries in the five counties are approximately as follows:

| | |
|---|---|
| Gloucestershire | 1600 |
| Somerset | 3400 |
| Wiltshire | 2800 |
| Devon | 550 |
| Cornwall | 300 |

The effects of wartime readjustments of employment did result in most cases in a reduction of these figures by approximately 20 per cent, though this was by no means uniform throughout the area. It will be noticed that this agricultural industry is most important in the counties of Wiltshire and Somerset which specialise most completely on dairy production, but even here the figures are quite small, largely because the amount of labour required, particularly in the milk collecting, condensing and evaporating plants, is very small in relation to the bulk of material handled.

The entire output of this industry is, of course, destined for home consumption in view of Britain's deficiency of dairy produce and a great deal of it is sent by rail to London for consumption in the London region or for redistribution to other parts of Britain.

### LEATHER INDUSTRIES

The skins and hides, which have been made available by the animal husbandry

of the Western Counties, naturally formed the basis and raw material for the beginnings of a leather and leather goods industry in this region and were used in the early days of the leather and boot and shoe industry of Bristol. (Excluding employees of Messrs Fry's chocolate works at Keynsham. See "The Industries of Bristol" as before.) But, as in the case of the Bristol industry, local supplies proved inadequate and the growth of the industry to its present importance has been made possible by the additional use of skins and hides imported as part of Bristol's trade with the Americas, Australia and the Mediterranean and Middle East countries. Apart from the Bristol industry itself the leather and skin working industries have been largely confined to the counties of Somerset and Wiltshire and here the dependence on imported material has been accentuated by the very remarkable degree of specilisation of production in the glove making industry and the manufacture of goods from lamb and sheepskins, both of which require a particular type of skin or hide, of which there is a completely inadequate local supply.

The sheepskin industry is completely localised in the small town of Glastonbury, where it is very largely in the hands of one firm, Messrs. Clark, Son and Moreland. The industry in the town is relatively small and employs about 500 persons, but the highly specialised production, particularly of sheepskin boots, has achieved such a reputation that it has a nation-wide market and considerably more than local importance and the manufacture of sheepskin flying boots has enabled this industry to maintain its production even during the war. The nearby town of Street also has an important leather industry which is exceptional in this region in that it uses ordinary types of leather in the manufacture of boots, shoes and sandals and it forms a completely isolated branch of this trade, the nearest important centre of the industry being in the Kingswood-Hanham district of Bristol itself. The localisation of the industry in Street is entirely the result of the enterprise of individuals of the firm of C. & J. Clark who were originally associated with the firm of Clark, Son and Moreland of Glastonbury. The firm normally employs about 1800 people, though in wartime the number was slightly reduced, and here too the prosperity of the industry has been ensured by concentration on the manufacture of special types of high quality footwear which has enabled the firm to command a market throughout the country. Since 1825 the firm has specialised almost entirely in women's and children's shoes, fur-lined slippers and sandals, but during the war they undertook the re-making of worn boots

FIGURE 2.—A food processing plant at Calne, Wiltshire. (Courtesy of C. & T. Harris, Ltd.)

for the U.S.A. forces and, following this experience, undertook the manufacture of men's demobilisation footwear and are now extending their normal production to include men's shoes. The building up of a large industry in so small and isolated a village as Street naturally presented serious difficulties in the provision of housing and amenities. Clark's have therefore undertaken much of this work and in addition to planning and provid-

ing vocational training for their labour force they have made the life of the community very largely self-contained by organising the building of model houses, by the provision of social and sports facilities and by the establishment of schools and a library.

The glove industry of Somerset and Wiltshire is not quite so completely localised as the other leather industries are manufactured and at Martock there has been a specialisation in three factories in the manufacture of silk and other fabric gloves. Gloves are also made at Milburne Port, Stoke-sub-Hamden, Taunton and Bath in Somerset, by five firms in Westbury, five in Salisbury and two in Warminster in Wiltshire, whilst one firm at Uley in Gloucestershire manufactures felt gloves.

FIGURE 3.—Condensery and milk processing plant at Staverton, near Trowbridge, western Wiltshire. (Courtesy of Nestle's Milk Products, Ltd.)

but even here there is a remarkable concentration of production in the town of Yeovil. In the town and surrounding rural district well over 3,000 people are normally engaged in the glove making and associated leather dressing industry, employed by eight firms of leather dressers and over 30 firms of glove manufacturers, including Messrs Dent, Allcroft & Co., who are one of the largest firms in the country and have works also at Warminster and Westbury in Wiltshire. Most of the firms employ comparatively small numbers, seldom exceeding 100 to 150 and many less than 50, but, of course, a great deal of the work of making up the gloves has always been done outside the factories as a home occupation. In Yeovil itself most of the gloves manufactured are of the heavier type of leather glove, but in some other districts the lighter types

There are comparatively few other areas in Britain engaged in the glove making trade and in consequence the greater part of the output of this region is absorbed in meeting the home market, and though a limited export trade has been developed it is on a very small scale and as a light, easily packed, commodity they can be despatched over a variety of routes. Altogether about 5,000 people are normally employed in the industry in the counties of Somerset and Wiltshire and in wartime this figure has not diminished greatly though of course the type of goods produced has been adjusted to meet the peculiar needs of the period.

### TEXTILE INDUSTRIES

Apart from the foregoing industries which, in their origins or in the present sources of their materials, may be re-

garded as agricultural industries, the most widespread group of industries in these western counties is a very varied series of trades working on textile materials in the production of yarns and cloths and their manufacture into clothing. No unit in this textile group of industries is large, and in many cases the manufactures are remarkably localised, so much so, that frequently particular occupations are centralised in one town or village and are often in the hands of single firms. This widespread but scattered interest in the textile trades is undoubtedly the legacy of the former important West Country woollen industry with its major centres in Gloucestershire, Somerset, Wiltshire and to a lesser extent in Devon. In part the legacy is a direct one and woollen manufacture still exists in areas where it was formerly of much greater importance. In these cases the survival has almost always been in the hands of one or two firms whose enterprise and whose concentration on a limited range of highly specialised types of cloth has enabled them to avoid direct competition in the large scale production of the more popular types of clothing material manufactured in the West Riding of Yorkshire. One of the most important concentrations of this "residual" woollen industry of the West Country is in the group of small towns of Stroud, Nailsworth and Dursley at the entrance to the large valleys of the central Cotswolds. Here there was formerly a very large and flourishing woollen industry and there still remain six fair-sized woollen mills in operation, employing about 1,440 people. In part these concerns continue to manufacture the true woollen cloths

FIGURE 4.—Shoe factory in the Vale of Avalon, the "tor" (hill) with its tower in the background, used as the trademark of the company. (Courtesy of Messrs C. & J. Clark, Ltd.)

of the broadcloth type, with a highly finished smooth surface, for which the West Country was famous and which were formerly used in the clothing trade. In more recent times they have chiefly taken the form of baizes, a type of material in which the larger Yorkshire industry has not specialised. One part of the industry in the Stroud area has, however, followed the example of the Yorkshire industry in changing over to worsted production, but in this case has concentrated only on the highest quality types of cloth with emphasis on the famous grey dyed cloths which have been in great demand, partly as a result of a considerable advertising campaign.

In Wiltshire relics of the former woollen industry are found in Trowbridge and Westbury where both woollen and worsted fabrics are manufactured, whilst at Wellington in Somerset Messrs

FIGURE 5.—Grange Avenue, a housing project built in 1938 with capital from the workers' "Centenary Pensions Fund." Rent from the cottages helps toward payment of pension to old age and retired workers. Glastonbury Tor in the background. (Courtesy of C. & J. Clark, Ltd.)

Fox Bros. and other firms have concentrated on the manufacture of serge cloths for specialised types of clothing, and at Frome there are a number of small wool working concerns. In the suburb of Twerton, in Bath, Messrs Carr Isaac and Co., have also kept alive the former wool manufacturing industry and here once again this has been achieved by specialisation in the less common types of fabric, a number of which were designed for the American export market. In Devon relics of the old industry are not so numerous and only about 700 people are so employed in the county, chiefly round Tiverton and Buckfastleigh. Associated with the former wide extent of wool working there were also, of course, allied manufactures of furnishings, particularly bedding materials, including flocks, and carpets. Bedding materials are still manufactured in all the areas where the wool trades survive but the manufacture of carpets is more localised and is only important at Stroud, Axminster and Wilton.

In South Somerset there is a most interesting concentration of textile working in the towns and villages in a belt of country stretching from Yeovil in the East to Chard in the West. Here there is one of the few industries in Britain based on flax, hemp and mixed fibres and it is one of great antiquity. Though the maintenance of textile working in this region may be partly due to the traditions of such work and the existing skill among the woollen workers, yet, in the main, the origins of this industry must be traced rather to the extensive growth of flax and other fibre-producing plants in the Southern half of the Somerset lowlands from mediaeval times onwards. The manufacture of linen in this region therefore grew to great importance in the seventeenth century and throughout the eighteenth century it was one of the most important occupations in Somerset and the adjacent counties of Hampshire, Dorset and Wiltshire. Linen manu-

facture is now largely centred in Yeovil, Crewkerne, Castle-Cary and Ilminster, but the manufacture of ropes and twine, in which the region later specialised, is much more widespread and is carried on in these four towns and in Misterton, Martock and Shepton-Mallet and in the North at Watchet and Bridgewater. Webbing is also a distinctive local product of this type in which the town of Crewkerne has specialised, though it is also manufactured in Yeovil. The manufacture of fabric sacks and the making of sheets of waterproofed fabrics form kindred occupations in the town of Shepton-Mallet, whilst in Crewkerne and Coker a related industry of considerable importance is the manufacture of sail-cloth and in the nearby town of Martock similar materials are used in the making of tents. The town of Castle-Cary in addition to its flax and hemp manufactures has a unique industry for the processing and weaving of horsehair.

Lace making is another local industry characteristic of this part of South Somerset and parts of Devonshire and one which originally used considerable quantities of fine linen thread spun locally. The famous lace of Devon, associated with the name of Honiton and with Tiverton still employs about 800 persons and the towns of Ilminster and Chard and of Taunton and Shepton-Mallet further North each have small lace concerns. In Chard the lace work has always been a machine industry in small factories, rather than a home, handmade occupation, and in this town a natural development of lace making has taken place in the making of nets which range from fine lace-like nets such as tulle to the coarser types like mosquito netting.

Silk throwing and weaving are more recent developments in this part of the country, where they were almost certainly introduced by workers from the much older silk industry of the London area, and it was not until the eighteenth century that the occupation became an important one. During the nineteenth century the greatest development of the trade was in Somerset where 2,000 workers were engaged, and it is in Somerset that the modern silk industry is most important in the towns of Taunton, Frome, Shepton-Mallet and

FIGURE 6.—Library Street, built and endowed jointly by C. & J. Clark, Ltd. and the late William S. Clark. (Courtesy of C. & J. Clark, Ltd.)

Bath, though there is a small branch of the industry at Tiverton in Devon and individual firms have factories producing silk at Nailsworth in Gloucestershire and at Malmesbury and Warminster in Wiltshire. Naturally the industry is entirely dependent on imported materials and its rapid growth was almost entirely due to available supplies of labour already skilled in textile processes.

Former fashions, when lace was an essential adjunct to the personal linen of the well-dressed and when shirts and collars were almost exclusively made from linen, or more rarely silk, explain why, in the region of Somerset which specialised in the production of these

fabrics, the making of shirts and collars became a very important associated occupation. Linen is still used to a considerable extent in the manufacture of collars, but in the case of shirts and pyjamas which are also made in this region at the present time, cotton has now almost entirely replaced the earlier material. Nevertheless the tradition and reputation of the firms in this region and the long-established skill of the operatives has ensured that this region continues to be one of the most important districts in the British Isles for linen towns of Chard, Crewkerne and Ilminster in South Somerset and in Bridgewater in the North, but there is an isolated "outlier" of the industry on a large scale in Gloucester where two firms employ about 400 operatives in the manufacture of shirts and collars.

From the point of view of space relations the South Somerset textile area and, of course, most of Devon and Cornwall, have only a limited connection with the Bristol region. Outwards from Bristol, radiating lines of road and rail communications make it possible

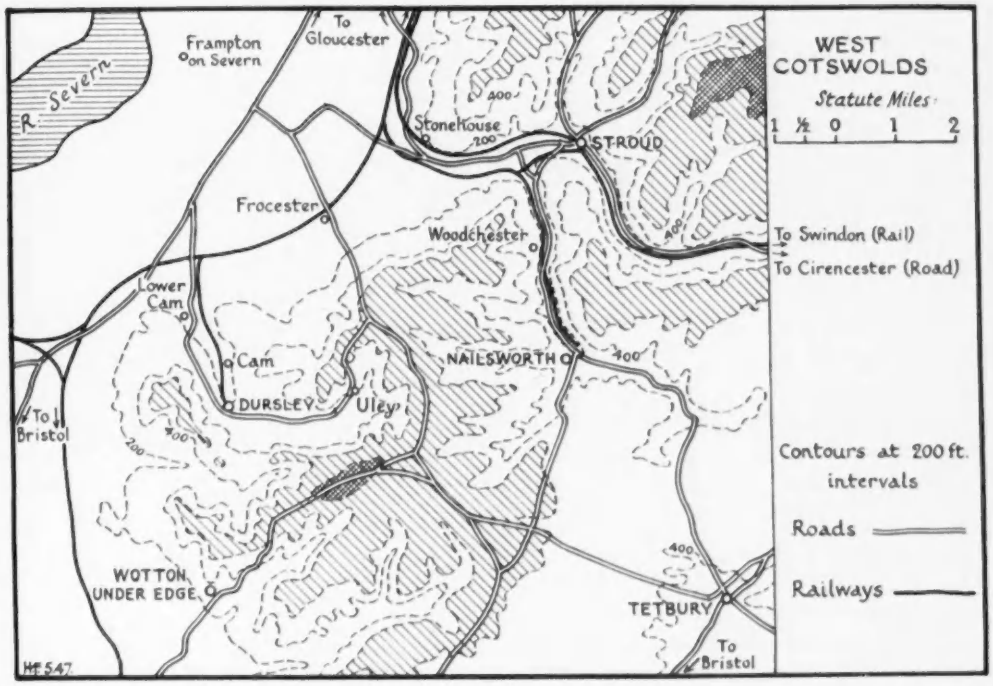



FIGURE 7.—The West Cotswolds about Stroud and Dursley in Gloucestershire.

this particular branch of the ready-made clothing trade. Taunton is the chief centre of this highly specialised industry, with a considerable number of firms, including four larger ones, each of which normally employs more than 200 persons and each of which produces goods whose trade names are household words. The production of these goods is on a rather smaller scale in the

for the whole of the Southern part of the hinterland of the port to receive commodities imported through or available in Bristol. On the other hand the products of this Southern area, destined normally for the home market, are not usually sent through Bristol. The two main routes between London and Exeter, the Great Western railway line through Reading, Trowbridge and Taunton and

the Southern railway line through Salisbury, both serve this region as well as Wiltshire without passing through Bristol and along these routes much of the produce, both agricultural and industrial, of South Wiltshire, South Somerset and the Southwestern peninsula proceed to the very large markets of the London region and to Southern and Eastern England as a whole.

The only remaining textile industry of this region is the manufacture, from a wide range of materials, of various elastic fabrics at Kingswood, near Wotton-under-Edge in Gloucestershire. This development is of comparatively recent origin and it is in the hands of one firm, Messrs. Tubbs Lewis & Co., who employ normally about 400 persons. It is of great importance locally as it absorbs a very large proportion of the available labour supply, on whose existing skill in wool working it was originally dependent, but the output of elastic materials and articles manufactured from them has considerably more than local importance since the number of firms engaged in this type of production in the country is very small. Elastic fabrics also enter into the manufacture of corsets, a very specialised branch of the clothing trade which Bath shares with the city of Bristol. In Bath itself there are no less than seven firms engaged in this trade, several of which produce very well known brands of goods which are sold throughout the British Isles.

The total number of adult workers employed in all the textile and clothing industries (excluding leather workers) is shown in the table below, but in order to discount the effect of the small scale making of clothing in the bespoke trade, and in dressmaking shops, a separate column indicates the true manufacturing industry in the case of firms employing more than 50 workers.

| | *Total Employees* | *Employees of Firms With More Than 50 Workers* |
|---|---|---|
| Gloucestershire | 9,488 | 3,892 |
| Somerset | 14,998 | 6,806 |
| Wiltshire | 5,128 | 2,739 |
| Devon | 6,084 | 3,403 |
| Cornwall | 3,154 | 358 |

The figures indicate normal prewar conditions and in all cases there was a decline during the war, of over 30 per cent in Wiltshire, 20 per cent in Gloucestershire, 15 per cent in Devon and 3 per cent in Somerset in the figures given in the second column; there was no comparable decrease in the small Cornish figure. The relatively slight decline in Somerset was connected with the nature of the textile output of the county, since netting, tent and sail cloth and webbing all have important military uses whilst the demands of the services for shirts, collars and gloves helped to maintain production in these trades. The greater decline in Gloucestershire and Wiltshire in turn reflects the necessary reduction of output of high-grade wool and worsted cloths and the comparable restriction of production in the general clothing and furnishing trades particularly in the towns of Gloucester and Swindon and in the Stroud area.

### PAPERMAKING AND PRINTING

The only other group of industries which has a wide distribution in the Western counties is that of the allied papermaking and printing trades, which have their greatest centre in Bristol but which are represented by individual firms in other towns and villages, particularly in Somerset. In Bath there are nearly 700 employees working for eight fairly large firms of papermakers and printers, including the publishing house of Sir Isaac Pitman, Ltd., and if

the considerable number of smaller firms are included the total number of workers is approximately 1,200. In the county as a whole the total employment in the papermaking and printing industries is well over 3,500 and of these nearly 3,000 are employed by firms who have a staff of over 50. These firms are scattered throughout the county at Wells and Wookey, Watchet, Creech St. Michael, Street, Bathavon, Frome, Taunton and Yeovil, and include specialists in all branches of the trade from high-grade book printing and stationery to the manufacture of hardboards and wrapping papers.

In Gloucestershire the numbers of workers employed in the paper industries are smaller (1,100 in firms employing more than 50 and a total of a little more than 2,000 in the county). Apart from firms in the Gloucestershire outskirts of Bristol there are two main centres, one in Gloucester itself and the other in the Cam-Nailsworth area where there is some specialisation in the manufacture of loose-leaf books and of paper stiffeners for local industries. One isolated and very specialised industry is the manufacture of blotting paper at the Postlip Mills of Messrs Evans Adlard near the town of Winchcombe.

In Devon the paper and printing industry is almost entirely confined to the towns of Exeter and Plymouth, though there is a very much smaller centre in Tiverton.

Many of the paper and printing firms throughout the region depend for their raw materials on pulp imported through Bristol or on paper actually manufactured in Bristol, but their products are seldom distributed through Bristol since they are either consumed locally or, in the case of certain products such as books, are despatched direct by road or rail to London and other parts of the British Isles.

The foregoing agricultural, textile and paper industries are all characteristic of widely-separated areas in the Western counties. But the other industries of these counties are so very varied that it is quite impossible to systematise them and they may best be described regionally. Even such an approach does not lend itself to systematic treatment since the only two industrial complexes which occupy continuous territory are in the Gloucester-Cheltenham area and in the West Cotswold area round Stroud. Elsewhere individual towns tend to have specialised in individual industries which frequently have

FIGURE 8.—Final assembly and flight shed of the Gloster Aircraft Company near Gloucester, north of Bristol. (Courtesy of Gloster Aircraft Co.)

no counterpart in other parts of the Western counties.

### WOOD AND METAL WORKING

In Gloucester itself, apart from the paper, food processing, and textile and clothing occupations already mentioned, industry is based mainly on timber utilisation and on metal working and engineering. Timber forms the basis of a very wide range of industries including the manufacture of matches by two firms and the manufacture of ladders, furniture, toys and incubators and provides a great part of the materials used in the building of railway wagons. Much of the timber used in Gloucester is, of course, imported by water along the Severn and Severn Canal and a proportion of this, particularly in the case of hard woods, is transshipped to barges at some part of the Bristol dock system or at Sharpness, and a smaller part sent by rail from Bristol. The engineering and metal industries of Gloucester are individually small in scale, using castings or forge and foundry pig iron drawn from the Midlands and worked up in the foundries and engineering plant of the city. The building of railway wagons, already mentioned, requires considerable quantities of metal work, the Gloucester Foundry Company has a great range of products and has specialised in the manufacture of pulleys and similar gear, there is one firm of hydraulic engineers and one firm of marine engineers who have gained a great reputation in the building of light marine engines for small craft of all kinds.

Cheltenham, too, has a small woodworking industry concerned mainly with the manufacture of furniture and a considerable light engineering industry. One large firm manufactures hydraulic gear and undercarriages, and the engineering branch of local industries has been augmented by the transfer of two firms from the London area in 1939, one making steam traps, thermostats and filters and the other meters and flow-gauges, whilst a new company has recently been established for the large scale production of clocks and watches

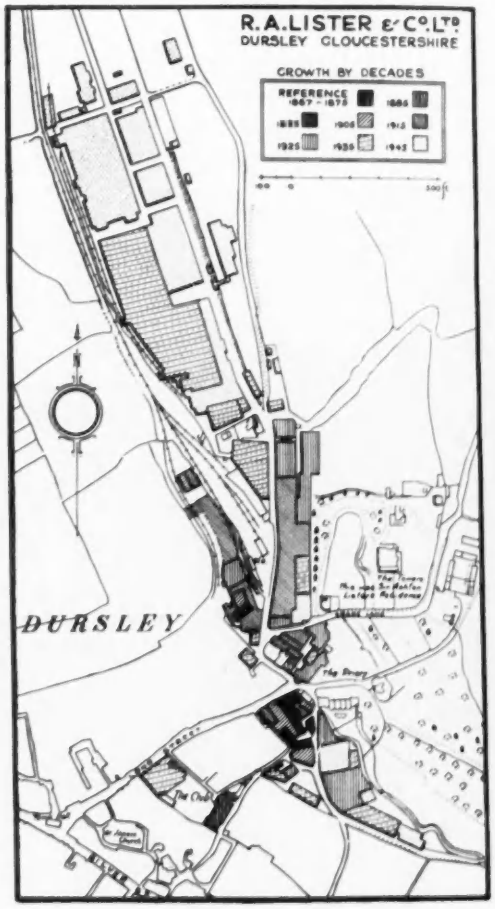



FIGURE 9.—The plant and environs of The R. A. Lister Co., Dursley, Gloucestershire. (Courtesy of R. A. Lister & Co., Ltd.)

in this area. The Light chemical industry is also represented in the Cheltenham area, one large firm of pharmaceutical chemists who supply markets in Wales, the Midlands and Northern England having been established in the town for 30 years, whilst a firm who manufacture chemicals for the food industries, including detergents and

sterilising chemicals, moved into this area as a wartime measure in 1940 but intend to remain.

### AIRCRAFT INDUSTRY

The industry which is most characteristic of the Gloucester-Cheltenham region in modern times, however, is the aircraft industry. Before the war the manufacture of aircraft on the outskirts of Gloucester and the manufacture of airscrews in the same area, was closely linked with the making of aircraft components by two firms in the outskirts of Cheltenham. During the war this industry naturally expanded greatly, four new plants being opened for this purpose round Cheltenham and the Gloucester concerns greatly expanded. Before the war rather more than 3,000 people were employed in this aircraft industry and during the war this figure rose to nearly 18,000, though, of course, this number includes a great many employees of small concerns, manufacturing components for wartime aircraft production, who do not normally engage in this industry. The figures, however, only give a small measure of the enormous expansion of the aircraft industry in this region, since much of the development occurred in the surrounding rural areas during the war, and this subject will be treated separately.

Near Gloucester itself by far the most important unit in the aircraft industry is the Gloster Aircraft Company of Hucclecote who have specialised in the manufacture of high-speed military aircraft since 1917 and who have supplied Gloster "Gladiators" and other types of aircraft to Governments all over the world. In 1933 the company was amalgamated with the Hawker Aircraft Company and though it continued to have its own individual development

FIGURE 10.—The great plant for the manufacture of agricultural implements and equipment, and small power units, and general light engineering, in the Stroud district, the town of Dursley in the foreground. (Courtesy of R. A. Lister & Co., Ltd.)

it nevertheless engaged in the quantity production of that company's types of machines and during the war built nearly 3,000 of the "Hurricane" type and over 3,000 "Typhoons." The most recent and most famous production of the company has been, however, the building of the Gloster "Meteor" jet aircraft, one of which, a standard Mark IV "Meteor," now holds the world air speed record. The company's works now cover more than 400 acres and house some of the largest press gear in the world.

Although the Gloucester-Cheltenham region is linked with Bristol, particularly from the point of view of the supply of industrial raw materials, its connections lie in part outside Bristol's hinterland when one turns to a consideration of its market area. Along the Vale of Severn the district is linked as closely by road and rail with Birmingham and the West Midlands as it is with Bristol and the Severn bridges in this area bring it into close contact with the Forest of Dean and the whole of South Wales. It must be remembered, too, that here there is the major rail junction between the lines running SW to NE along the Vale of Severn and the direct London to Cheltenham and London-Swindon-Gloucester lines. Moreover the importance of this rail and road link with the market and redistributing centre of the London region is likely to be increased by the advent of firms and branches of larger firms from the London area whose goods have a large sale in the metropolis or are distributed on a nation-wide scale from London headquarters.

### METALWORKING AND ENGINEERING

The West Cotswold area includes the three towns of Stroud, Dursley and Nailsworth and the surrounding rural districts with numerous villages such as Cam, Stonehouse and Frocester. It coincides very closely with one area of localisation of the former woollen industry and mention has already been made of the relics of that industry which still survive here, and of the local paper and cardboard industries. But the area is now one of more general industrial character and includes a wide range of metalworking and engineering trades. In origin this engineering activity is probably to be related to the need for constructional and maintenance work on the machinery of the woollen mills, but in more recent times it has been a deliberate policy of local firms to develop new forms of production of a mixed character to replace the declining wool industry and so preserve the industrial prosperity of the district, in many cases the original woollen mill buildings being themselves adapted to the new industrial uses.

In the Stroud district the engineering is very varied indeed in character; it includes firms who produce such diverse goods as gas-works equipment, pumps, mechanical conveyors and hairpins. The neighbouring town of Nailsworth specialises in valves, cocks and fluid control gear, but it is in Dursley that the development of engineering is most important. Here the industry is largely in the hands of one firm, Messrs. R. A. Lister & Co., Ltd., who specialise in the manufacture of plant and equipment for agriculture and agricultural industries and the building of small power units and general light engineering. The original undertaking was a small concern established almost in the heart of the town of Dursley and in this agricultural region its products had a ready sale. As the firm developed the demand for its products spread throughout the country and a considerable export trade grew up, so that during the past 40 years the firm has expanded very greatly and

its growth is shown diagrammatically in the accompanying sketch and photograph. The total employment in engineering work in Dursley is normally about 3,000 and as this is vastly in excess of the available labour supply in the town, workers travel to Dursley daily from many of the surrounding villages so that the industry has great importance throughout the area. In Dursley there is also an important electrical engineering firm and electrical engineering is also represented by two firms established comparatively recently at Stonehouse.

Apart from the mixed engineering industries there are also in this area a number of other very varied occupations. Originally based on the turning and working of local beech and other woods from the scarp valleys of the Cotswolds, the woodworking industries now depend on imported timber, but are still quite important. Walking sticks and umbrellas are one peculiar local specialty manufactured by three firms in the Stroud-Nailsworth area, wooden incubators are made at Woodchester, which also has a piano factory, and more general types of furniture are made in Stroud. Of the miscellaneous manufactures of this region mention may be made of asbestos manufacture by a firm of belting and general asbestos goods makers at Dursley and another firm specialising in the manufacture of brake linings at Stroud. In Stroud too there is one of the oldest firms in England engaged in the manufacture of plastics and a chemical firm which specialises in the manufacture of manganese products and drying agents. At Stonehouse there is one firm of rubber and rubber compound manufacturers and two new concerns manufacturing roller bearings and instruments which moved to this area as a wartime measure but propose to maintain works in the area permanently.

The tendency for new developments to take place in the Stonehouse district rather than in the Stroud-Nailsworth area appears to be due to the restricted nature of the sites in the deep narrow valleys of the latter area when compared with the more open and extensive sites available in the plain near Stonehouse, where the Swindon-Gloucester and Bristol-Gloucester railways converge, providing ample transport facilities, and where considerable industrial development may take place in the future.

Considering the West Cotswold area as a whole it seems possible to generalise to the extent of saying that almost all the products of this region are those of well-known specialist firms who can command a market all over the British Isles for their output, or alternatively are products where the bulk and weight is small compared with the cost of production, so that the relative isolation of this district is of little or no importance. It is interesting to note that the railway line through the town of Stroud is the Gloucester-Swindon line of the Great Western Railway, so that, by this line, rail communications with Swindon and London, on the one hand, and Gloucester and the midlands on the other, is as easy as with Bristol, and in fact Bristol handles and distributes very little indeed of the industrial output of this region.

Of the remaining industrial towns in the Western counties, Swindon is by far the largest. The town is, of course, entirely dominated from an economic point of view by the presence of the Great Western Railway Company's main works for the building and repair of locomotives and rolling stock. Apart from the engineering side of the railway works, the plant involves woodworking, upholstery and paint shops and electrical

equipment, and employment is normally provided for some 15,000 persons in a very large group of trades. In the main the industry is remarkably self-contained and the raw materials can be conveniently brought by rail from any part of Britain. Moreover the output of the plant is unusual in that it is destined for use solely by the producing company and is useable and mobile on leaving the works, so that transport costs do not enter into consideration. Swindon's railway production is therefore distributed all over the Great Western Company's system and from this point of view Swindon's industrial character is not proper to the region in which it is situated but is in a sense an artificial creation. In addition to the railway works there is one very large firm of engineers in Swindon manufacturing light mechanical components which are used all over the country and especially in manufacturing plants in the London area. Besides these large industrial units, the presence of a large urban population has given rise to a group of smaller textile, clothing, food and tobacco industries, but these have all a purely local significance.

In Wiltshire, between Swindon and Bath the towns of Chippenham, Melksham, Devizes and Bradford-on-Avon form a very dispersed industrial region where local industries have developed only in the individual towns and where there are few common characteristics. Each of the towns has food processing and milling industries associated, as already mentioned, with the agricultural character of the region, but the other industries are highly specialised.

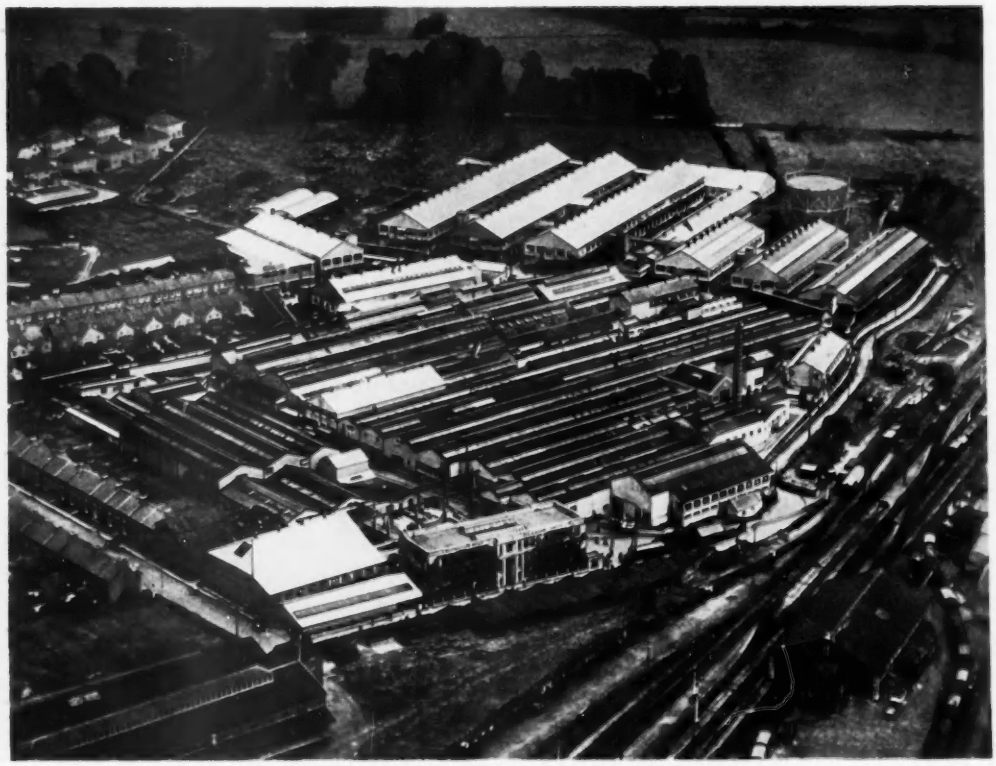


FIGURE 11.—The extensive plant of the Westinghouse Brake & Signal Co. at Chippenham, which employs over 2,000 workers. (Courtesy of Westinghouse Brake & Signal Co.)

At Chippenham the Westinghouse Brake and Signal Company have their large factory which employs over 2,000 workers and which developed after the amalgamation of a firm established here in 1895 with two other firms from London and Worcester. A large part of the output of the plant consists of compressed air, electromagnetic and vacuum brakes and power-operated and mechanical signalling devices which are supplied to the British railway companies or to firms who build locomotives for export. In addition air and vacuum brakes for motor vehicles, air compressers, steam heaters, power decking and air-lock control gear for collieries and all types and sizes of metal rectifiers are manufactured. The company is one of the largest in the British Isles which manufactures the types of products mentioned above, particularly in the case of railway brake and signal gear and metal rectifiers, and in consequence its goods have a widespread market. It will be seen from the photograph that the works are situated alongside Chippenham station on the "up" side of the Bristol-London track and a large part of the products of the plant are sent to the various railway works and to London and the rest of the British Isles over this route.

At Melksham rubber manufacture has been established since 1890 by the Avon India Rubber Company and this firm, too, is one of a comparatively small group of large companies in this industry in Britain. The firm normally employs nearly 2,000 operatives drawn from surrounding villages as well as from Melksham itself. Its best known products are pneumatic tyres of all types, but in addition the firm produces rubber materials for flooring, footwear, sports goods and mechanical and general rubber goods. The industry is somewhat isolated from similar concerns since there are only small rubber firms in Bristol and Bradford-on-Avon and its products have a wide sale all over the West of England as well as a considerable share in the national market for such goods.

The industrial character of the towns of Devizes, Trowbridge, Westbury, Warminster and Frome, to the South, is more varied and there are no exceptionally large individual firms, but there are many smaller firms in the light engineering, textile and food processing industries. Similar varied industries exist in individual towns all over Somerset, particularly in the case of the engineering group of industries. In Bath, for example, there are seven such engineering firms, including two larger ones, whilst in the Somerset coalfield towns and villages of Pensford, Clutton, Paulton, Midsomer-Norton and Radstock, there are also small engineering, woodworking, wagon-building and printing industries. Some coal from this Somerset portion of the so-called Bristol coalfield is in fact used in Bristol, but the link between Bristol and the coalfield is far less important than might be imagined, because much of the Somerset coal is used in the surrounding country areas and in Wiltshire and Dorset, whereas Bristol draws a large part of its supplies from South Wales. Ease and cheapness of water transport across the channel and up the Avon to the City Docks makes it possible for coal from the large South Wales field to be marketed in Bristol at competitive prices and the dock-side location of the large power station at Portishead and one of the main gasworks in the city docks makes them well adapted to the use of water-borne coal.

In the rest of Somerset, industries, other than those characteristic of the region as a whole, have developed mainly in the towns of Bridgewater

and Yeovil. Bridgewater shares the characteristic textile, clothing and food processing industries of the county, but the most important of the specialised local industries is the modern manufacture of regenerated cellulose film by British Cellophane, Ltd. The basic raw material required is, of course, wood pulp and this is obtained from imports through Bridgewater or Bristol, whilst the choice of site on the outskirts of Bridgewater was in some measure determined by the availability of large supplies of fresh water which are required in the process employed. In normal times a very large part of the firm's output is used in this country for the wrapping of foodstuffs, tobacco products and sweets and the material being light and easily packed it can be sent to all parts of the country without difficulty to meet this general demand. At present most of the factory's production is reserved for export and it is possible, of course, that this export trade may prove more than a temporary phenomenon. The manufacture of wicker goods such as baskets and wicker furniture is another industry characteristic of Bridgewater, though in this case it is an industry carried on by numbers of small firms not only in Bridgewater but also in the small towns and villages surrounding the former marshy land of the Somerset lowlands where the necessary osiers and reeds are grown. Local materials also form the basis of the manufacture of bricks and roofing tiles which is of considerable importance in the Bridgewater-Highbridge district and here there are, in addition, firms in such diverse trades as jam-making, wire rope manufacture and oil-seed crushing. On the Northern outskirts of Bridgewater considerable new industrial developments are taking place and one large factory for the manufacture of plaster-board, for use in the building industry, is now nearing completion.

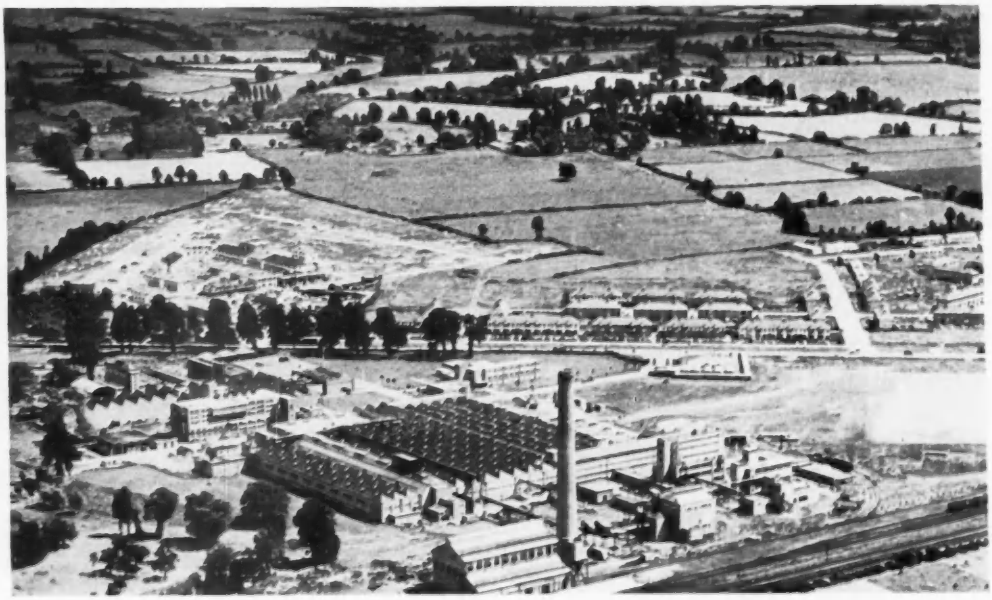


FIGURE 12.—A factory on the outskirts of Bridgewater for the manufacture of cellulose film. The site for the factory was chosen in part by the availability of large supplies of fresh water. (Courtesy of British Cellophane, Ltd.)

Apart from the glove making, textile and food processing occupations already mentioned, the industries of Yeovil are mainly in the engineering group of trades. Messrs. Petters specialise in the manufacture of internal combustion engines and auxiliary plant of various types, whilst the Westland Aircraft Company have manufactured a variety of types of military aircraft and are the largest individual undertaking in Yeovil, since they employed some 1,500 workers before the war and this figure was doubled during the war.

In Devonshire the towns of Exeter and Plymouth have the small industrial undertakings associated with their character as important population centres in a dominantly rural area. In addition Exeter has a number of general engineering and paper and printing works, whilst in Plymouth economic life is completely dominated by the presence of the naval shipyards. Apart from the employment of over 10,000 workers in the yards, there are of course large numbers of H. M. Forces normally stationed in and near the town and many of the industries of the town itself, though not directly connected with the yards, are nevertheless mainly concerned with supplying the needs of the very large numbers engaged in the town's chief industry. During the war the importance of the naval shipyards naturally increased enormously and there was a correspondingly large increase in employment. From the point of view of the economic character of the Western counties as a whole, however, Plymouth is really an area apart, since the industry is essentially non-productive from a consumer standpoint and is very largely self-contained.

There are still remnants of metal mining and larger units producing china clay in various parts of Cornwall, but their importance is very limited. The past record of mining is responsible, however, for the only large development of industrial activity in Cornwall in the Camborne-Redruth area where there are several firms engaged in the manufacture of engineering products for the mining industry. Many of these products are now either exported or sent to other parts of Britain and the same applies to the manufacture of explosives in the same area, most of which are normally used for mining operations.

Before considering the conclusions which may be drawn about the character of industry in Southwestern England, some reference must be made to temporary changes which occurred in wartime, apart from the individual developments already mentioned.

The most remarkable wartime development in this region was the enormous development of the aircraft industry and, as this scarcely affected the counties of Devon and Cornwall, it was in the three counties of Somerset, Gloucestershire and Wiltshire that the growth was most phenomenal. The need for Britain's aircraft industry to have a large part of its plant in what was thought to be the safer western part of the island was one reason for the great expansion of existing aircraft manufacturing concerns in these counties. In addition the chalk downs of Wiltshire and the Cotswolds in Gloucestershire provided good areas for the construction of airfields and many of the new developments in this area were associated with the establishment of assembly and maintenance plants on or near the new airfields. Employment in this industry in 1939 absorbed approximately 33,000 workers, but during the war this figure rose to about 76,000. In approximate figures the increase of 43,000 was made up of 21,000 in Gloucestershire, 11,000 in Wiltshire, 6,000 in Bristol, 4,000 in Somerset and 1,000 in Devonshire. In

the case of Gloucestershire and Bristol the expansion of 27,000 largely took the form of increased employment by the Gloster Aircraft Company near the city of Gloucester, by the Bristol Aircraft Company at Filton and in the surrounding area and by the Parnall Company at Yate, but in addition many garages and small engineering factories and workshops in Bristol and Gloucester manufactured or finished parts and spares for the aircraft manufacturing companies. In Wiltshire, on the other hand, the industry was newly developed in wartime and was mostly situated in completely rural areas where the new airfields and maintenance units were established. In Somerset the increase was shared almost equally between the area round Yeovil, where the Westland Company increased its direct and indirect employment very greatly, and various districts to the South of Bristol near airfields and at dispersed units of the Bristol Aircraft Company. Naturally a return to peacetime conditions has produced certain problems where aircraft workers have been declared redundant and in some cases, particularly in the smaller towns, temporary unemployment has resulted. In most cases, however, especially in Bristol and Gloucester, the change has merely represented the return of employees to former posts or the changeover of small engineering firms to peacetime production in place of wartime sub-contracts for aircraft companies.

A much smaller, but nevertheless very valuable, development of a similar type was the great growth of the building of boats of all types, for wartime use, in the many small ports and along the rivers round the coasts of Devon and Cornwall. The number of employees in these small boat-building yards increased from about 2,700 to 7,700, the increase consisting of a great many comparatively small developments, the largest of which were at Brixham, Dartmouth, Totnes, Falmouth, Looe and West Penwith.

Finally, a great many firms whose works were in the more vulnerable parts of Southern and Eastern England moved to towns, or even villages in the Western counties, or in some cases established secondary plant in this area. In a limited number of cases, some of which

FIGURE 13.—Works of the Avon India Rubber Co., Melksham, established in 1890, employing about 2,000 operatives from surrounding villages, as well as Melksham itself. (Courtesy of Avon Rubber Co.)

have already been indicated, these firms have decided to retain establishments in this region, but on the whole the arrangements were purely temporary ones.

## CONCLUSION

In conclusion perhaps one may sum up by saying that though the Western counties form an essentially agricultural region, yet on closer analysis, industrial activity is seen to play a much more important part in the urban life of the area than might be imagined. But the industries are all small when studied from a regional point of view. Individual firms and units of production may be large and certain particular industries like food processing and the textile and paper manufacturing industries have quite a wide distribution

throughout the region, but there is no development of compact areas with basic staple industries. Instead the industrial pattern of the region is that of comparatively small towns, or even villages, widely scattered, and each having its own specialised industry as well as a share in the industries which have been indicated as characteristic of most parts of the region.

From the point of view of the character of production it is possible to divide the industries of this region into three main categories: Firstly there is a group of unspecialised industries whose output is mainly destined to meet the needs of this region itself for the products of the light engineering, paper and clothing industries. Secondly the food processing industries, concerned primarily with the treatment of milk, but including also bacon-curing and meat cooking and packing and a certain amount of milling, particularly in Wiltshire. Here the products have wide distribution throughout the country, but in the main it is to the London market that region is tributary. Finally, the third and largest group of industries in the Southwest counties are extremely varied and specialised and this specialisation, often by individual firms, is largely the outcome of negative influences. The initiative of managements and the consequent expansion of former small businesses have frequently been the basis on which considerable local industries have developed. But, in almost every case, the concerns have had to contend with what would normally be considered as fundamentally unfavourable geographical conditions. Relative remoteness from the main regions of dense population in the British Isles, the scattered nature of settlement and the lack of a large industrial labour force, the absence of a really large local coalfield and the absence of the involved network of services and commercial organisations so necessary in a highly evolved industrial complex and only possible in compact industrial regions like the London area or Southeast Lancashire, have all retarded development. Consequently in almost every instance where such development has taken place it has only been possible because the firm in question has maintained an exceptionally high standard of production of high quality goods, or alternatively, has specialised in the production of unusual commodities which have been able to command an important share of the national market. In all cases, moreover, it has been natural that production has been concentrated on the smaller and lighter commodities of high value in relation to transit costs, so that they can compete on favourable terms elsewhere in Britain. In some cases the great reputation of these highly specialised firms has led to the development of a limited export trade, but the total bulk of goods concerned is very small indeed when compared with the output of the heavy industrial areas of Northern England and other areas with a staple heavy industry.

In so far as it is possible to regard the Southwestern counties as the hinterland of the port of Bristol, it will be seen that the relations between the port and its hinterland are as one-sided as the trade of the port itself, or very nearly so. Bristol's trade is virtually exclusively concerned with the import of foodstuffs, chiefly grains and fruit, wood and wood-products and petroleum (see "The Port of Bristol," ECONOMIC GEOGRAPHY, Vol. XV, No. 2) and the distribution of these commodities and of part of Bristol's coastwise imports and locally manufactured goods, throughout the five counties, links them with Bristol. On the other hand, the almost

complete absence of exports from Bristol is partly due to the absence of heavy staple industries, manufacturing bulk goods for export, within this hinterland, and partly to the fact that the products of this region are seldom transmitted through Bristol. On the production side, the five counties have a totally different arrangement of their space relations and they lie on the perimeter of the radial lines of communications centering on London or on the fringes of the area coming under the influence of the West Midland industrial region.

Bristol's geographical position and port arrangements make it an ideal supply port for the Western counties, but it does not function as the industrial capital of the region. In the case of almost every industrial region in these counties, Bristol lies off the direct route between the production centre and the chief markets for the commodity in question, and it is only the importance of the large local population and market and the presence of a number of important wholesale distributing firms in Bristol that gives the city any special significance to the industries of this region.

# GOLDFISH INDUSTRY OF MARTINSVILLE, INDIANA

*James R. Anderson*

## The Industry

LOCATED thirty miles southwest of Indianapolis near Martinsville, Indiana, the largest goldfish production center in the United States has been developed (Figure 1). Here many million goldfish are raised annually to be distributed throughout the United States and Canada. Starting in 1899 as a small experimental enterprise, the fisheries at Martinsville have become a million-dollar-a-year business. Widespread markets for goldfish have multiplied rapidly, permitting repeated expansion of the industry. It has now outgrown the original site and new hatching and storage ponds have been constructed in six other favorable locations near by (Figure 2). The larger of the two fisheries has 650 ponds covering 350 acres, with an annual capacity of 40 to 50 million goldfish. The average annual output during recent years has reached 20,000,000.

In 1934 a second fishery situated in the same locality (Figure 2) began shipping goldfish on a nation-wide scale. The smaller fishery has 116 ponds covering 50 acres of creek bottom land. The annual capacity of the fishery is about 5,000,000 goldfish.

Other competing fisheries do not have production volume comparable to that of the two fisheries. The closest competitor, located at Stoutland, Missouri in the Ozarks, has developed rapidly under conditions similar to those at Martinsville. Founded by a former Martinsville fishery employee, the Ozark industry has been supplying much of the Southwest market. A sizable fishery at Three Springs, Maryland and much smaller fisheries in Ohio, Kentucky, New Jersey, Tennessee, Alabama, Washington, and California also produce goldfish.

The industry is peculiar. Expert care is necessary similar to that required in the handling of silkworms. That the hatching and raising of goldfish is so concentrated suggests that geographical factors have been significant.

## The Production Pattern

In late April and early May parent fish are paired and placed in spawning ponds where rectangular frames containing nests of Spanish moss secured by wire webbing serve to catch the eggs (Figure 3), about 60 per cent of which are fertilized. Fish begin spawning at sunrise and continue until about noon. The nests are removed as soon as filled and are placed in hatching ponds, where the eggs hatch in from three to ten days (Figure 4). Feeding begins on the second day after hatching. Especially prepared powdered food is dissolved in water and sprinkled around the edge of the pond. After subsisting for ten days on this liquid diet, the fish are fed a low grade of dry wheat flour. Corn meal is used after a month to six weeks. Overfeeding must be carefully avoided.

It is desirable that the fish attain the reddish color soon. Young goldfish are olive black for four to six months or longer. Many experiments have failed to devise a method for speeding up and assuring coloring. Success would greatly reduce production costs, for the expense of retaining the fish until coloring takes place is considerable.

Rate of growth during the first three months is about an inch a month, after which growth is much slower. The average age of goldfish leaving the hatcheries is ten months. The harvesting season commences in October and continues to December. About 35 per cent of the crop is shipped during the fall, the remainder is held until the following spring and summer.

The harvesting is commenced by combing the ponds with large seines. Then the ponds are drained and the mud of the pond bottoms is searched carefully with scoops. The fish are hauled in tank trucks to a group of ponds immediately surrounding the shipping depot. At the ponds they are dumped into screened cages and sprayed with water to harden them for shipment. The fish are then separated as to kind and size. Uncolored fish are returned to the ponds for the winter.

The goldfish produced are usually classed as common or fancy. The common goldfish is the parent stock of the fancy varieties. Types of fancy goldfish raised most commonly are: (1) comets (rapid movements of this species make them especially attractive for ponds and fountains), (2) fantails (with elaborate fanlike fins), (3) telescopes (having large protruding eyes), (4) Japanese nymphs (short plump bodies with large winglike fins), and (5) shubunkins (distinguished by striking variety of colors exhibited in a single fish). The demand for the more expensive fancy types is practically equal to that of common goldfish, since they are desired for more elaborate ornamental effects.

Shipment is chiefly by express containers (special metal cans with ice compartments) or by tank trucks which deliver fish to distributing points, for example at Saddle River, N. J., Chicago, Atlanta, Ga., and Cairo, Ill. Before the war, shipments were occasionally made to Germany, Mexico, France, South Africa, Egypt, Philippine Islands, India, and Hawaii.

## POSITION

In explaining dominance of the Martinsville fisheries, the central location in respect to markets, the availability of good highways, and relatively cheap labor are important. The proximity of Martinsville to the "center of population" of the United States aids in efficient distribution of a perishable product. Access to a network of good highways and railroads radiating out of Indianapolis also facilitates rapid delivery even to relatively distant markets.

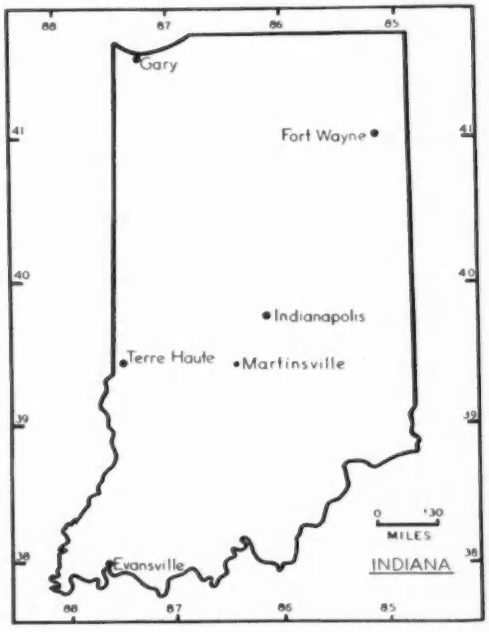



FIGURE 1.—Martinsville—its location in Indiana. It is about 30 miles southwest of Indianapolis. It is the principal center of goldfish production in the United States.

## SITE

The original site was a small swampy area of about 100 acres that could not be utilized for common cultivated crops

(Figure 5). Bluffs to the west and ridges to the south and east underlain with impermeable shales almost surround the headwater bottoms of a small creek (Grassyfork), which flows down a gentle gradient. Numerous natural springs flowing from the valley sides and floor contributed to the swampiness and suggested an adequate water supply for fish ponds. The principal cause of the springs is related to glaciation. Near Martinsville, the pre-Illinoian valley of White River was filled by outwash sands and gravels which deflected the river to the north of the above-mentioned bluffs.

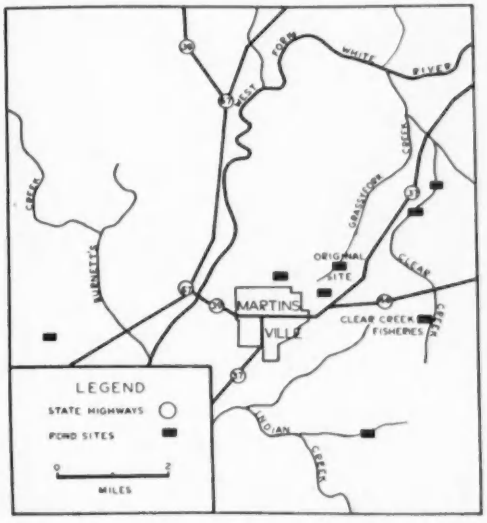



FIGURE 2.—Distribution of fishery sites. Location near headwaters of creeks is characteristic. The two sites not shown on a stream course have an extreme headwater location; consequently they are relatively small in area.

It was not difficult to turn the restricted swampy area into numerous small ponds, each separated by low levees of soil material scraped from the pond floors (Figure 6). The gradient was sufficient to allow ponds to be drained by gravity. The same favorable conditions permitted low-cost pumping of water from wells to the underlying gravels to supplement the natural springs, when they became inadequate. Important in permitting expansion, was the presence of several other favorable pond sites near by (Figure 7). Thus impervious shales, the topography, restricted surface drainage, combined with year-around rainfall gave the Martinsville site favorable physical characteristics for the raising of goldfish.

## CLIMATE

Also highly important are suitable temperature, sunshine, and precipitation conditions. While goldfish will spawn and grow under diverse climatic conditions, a near-the-optimum climatic situation is required if mass production is to be profitable. Spawning is encouraged by temperatures that vary daily from 60 to 90 degrees. Whenever daily variation is slight, spawning is reduced. Therefore it is important that favorable temperatures for spawning exist for a period of several weeks. For Martinsville approximate average maximum and minimum are 78 and 56 degrees in May and June, period of heaviest spawning. Occasionally daily temperature fluctuations are increased artificially in order to lengthen the spawning season.

Hatchability is highest when temperatures range from 80 to 90 degrees, approximately three-fourths of the eggs hatching within these limits. Therefore the afternoon hours are the daily hatching period, while the early morning hours when the water is chilled is the time of spawning.

Daily temperatures which average 75 to 80 degrees during the main growing period, and a cool season, but not a prolonged cold one, are also required for profitable goldfish production. Lower temperatures make necessary a longer growing season, often increasing the number of fish that must be held over the winter because they are not brightly colored. Essential also is absence of

prolonged low temperatures which would freeze ponds solid, causing serious loss.

After spawning and hatching have completed, daily variability is not required. Indeed a more equitable temperature is favorable. Goldfish grow best in water temperatures of 60 to 70 degrees. Since water normally is some cooler in summer than the air, average air temperatures of Martinsville for the months of June (72°), July (76°), August (74°), and September (68°) are almost ideal for growing goldfish.

Sunshine is an important factor in the hatching, coloring, and health of goldfish. Warm days with abundant sunshine permit the eggs to hatch in two days; cool, cloudy, and windy weather may delay the hatching a week. Rainy, windy weather just after hatching often causes heavy loss of baby goldfish, which cannot live in murky water.

Adequate sunshine is requirement for vigorous goldfish. Lack of it makes

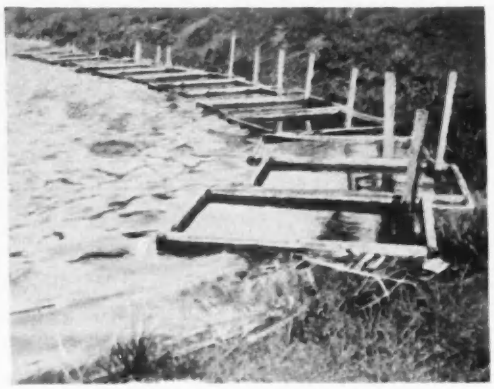


FIGURE 3.—Spawning nests placed around edge of pond. Only a limited number of nests are placed in each pond. The anticipated spawning and the number of breeding fish stocked in the pond determine the number.

them susceptible to disease. Likewise continuously hot dry weather is unfavorable.

Since goldfish are colored by exposure to sunlight, much sunshine promotes rapid coloring. At Martinsville 60 to 80 per cent of the goldfish normally color in about four to six months. During a late summer and fall with much sunshine about 80 per cent of the fish will color. In a cloudy season only about 50 to 60 per cent color. In central Indiana June, July, and August are quite sunny; and September and much of October also usually have sufficient

FIGURE 4.—Concrete hatching tanks reduce the loss of eggs during the hatching period. Three nets of eggs are in one of the compartments. Young fish are soon transferred to growing ponds.

sunshine to facilitate goldfish coloring Although farther south, in Kentucky for example, a longer period of high bright sunshine occurs, the rather large fluctuations in daily temperature essential for the spawning season are less prevalent. To the north, in Michigan for example, the necessary warmth does not prevail for a sufficient period, and although the midsummers are sunny, the favorable season is shorter. The Martinsville site therefore approaches optimum for spawning, hatching, and growing more nearly than do areas either to the north or south. Since a dormant season is a requirement for vigorous goldfish, the winters of Martinsville are not a handicap. Indeed they are normally an advantage in

that during winter the goldfish require little care or food.

Adequate and reliable rainfall is necessary. Exhaustion of available water supply during the growing season results in serious loss. Amount and reliability of rainfall decreases notably westward in the Midwest with drouths generally more frequent and severe. In Iowa, for example, the average annual rainfall is only 30 inches compared with 42 inches at Martinsville. While to the east of Martinsville, rainfall conditions are equally favorable, a more highly competitive labor situation is a disadvantage there.

Thunderstorms, relatively common in central Indiana during the spawning months of April, May, and June, are beneficial. Such showers lower water temperatures slightly which induces spawning. In other words, the nightly drop in water temperatures are supplemented by a sudden shower.

## SOILS

A curious relationship of fish culture to soil conditions has been observed at the Martinsville fisheries. Ponds with dark muck bottoms are distinctly better for coloring fish than are ponds upon the more prevalent light colored clays. This is explained by the fact that dark colors absorb more sun's rays than do lighter ones. Goldfish from muck bottom ponds have deeper red color than those of a reddish-yellow color grown in light clay bottom ponds.

FIGURE 5.—Aerial view of the original fishery site on Grassyfork Creek. Smaller ponds in the foreground are spawning and hatching ponds. The larger ones are growing or producing ponds. An orchard site on the right is a supplementary land use on the 1500-acre fish farm. Grazing of purebred Angus cattle is another profitable use of the watershed area of pond sites.

### PESTS

Keeping ponds relatively free of weeds, snakes, bugs, and fish-eating birds are necessary precautions. Spawning ponds must be clear of all weeds and trash to force the breeding fish to use the artificial nests. Before eggs are placed in hatching ponds, the ponds are chemically treated to kill egg-eating bugs. Snakes and "fish hawks" are a menace to growing parent goldfish; consequently the fishery owners have federal permits to kill certain birds, including herons and kingfishers.

### LABOR

An adequate supply of labor which has become skilled in caring for goldfish is available. Because of comparatively low living cost in Martinsville, wages are lower there than in somewhat larger cities. Supply of moderately cheap labor is related to population growth of Martinsville (pop. 5,009 in 1940), which was greatly stimulated in the decade prior to the establishment of the fishery by the commercial utilization of mineral waters and by the development of clay and wood products industries. When these other employers of labor declined, the goldfish industry had an ample supply at moderate cost. The industry has about 200 full-time employees, approximately three-fourths skilled permanent employees. The workers tend to stabilize the industry, as in another location such skilled workers are either not available, or if brought in, demand higher wages. There is some additional demand for labor in the goldfish industry during October and November, the peak period of harvesting, which includes gathering fish, sorting, counting, and "toughening" for shipment. However, over 95 per cent of the workers are employed for the whole year.

### FOOD SUPPLY

Food for the fish ranks with labor as a major cost item. A pound to two pounds of feed per 1000 goldfish is required daily during the growing season. While the water is warm, the fish are fed heavily to get maximum growth. With 15 to 20 tons of food consumed daily, Martinsville's location near corn and wheat production is advantageous. Situated in a fertile river valley on the southern border of the corn belt in

FIGURE 6.—The headwaters of Grassyfork. In the extreme background a small dam has been constructed which regulates the water level in the ponds downstream. The ponds are connected by pipes which are closed when the desired water level in a pond is attained.

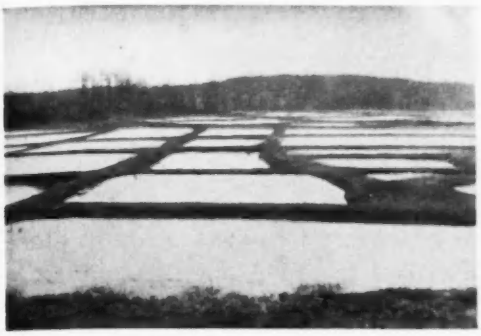


FIGURE 7.—Site of the Clear Creek Fisheries. Note similarity of this site and that shown in Figure 6.

Indiana, Martinsville has plenty of grain near at hand. Dried egg yolks, used for feeding young fish, are obtained from Indianapolis. Therefore transportation costs on feeds are small.

## MARKETS

The elastic demand for goldfish which is characteristic is a serious complication. Much like the farmer, the goldfish producer must raise his fish crop in anticipation of good markets. The colored fish are sold in wholesale lots to such concerns as nickel and dime stores, chain stores, pet shops, department stores, seed stores, drugstores, and florist shops. They are regular retailers of goldfish, but unusual sales, such as for mosquito control afford a supplementary market. Shipments to the smaller dealers are usually by first-class express from Martinsville or from distributing points maintained by the fisheries. Large shipments are often delivered by tank truck.

The leading market area is the East Coast from Virginia northward, an estimated two-fifths of the colored fish being sold there. The Middle-West markets constitute about one-third of the total, the South, one-fifth, and the West Coast, one-tenth. Thus distribution of markets correlates with population.

Another locational advantage has become evident recently. A heavy demand for bait minnows gives the hatcheries a profitable method of disposing of the "off-color" fish, otherwise of little value. Because it is more active and stays alive longer, fishermen prefer the goldfish minnow to the ordinary minnow. Colored as well as uncolored goldfish make attractive bait and are widely sold for that purpose.

The Martinsville site is fairly centrally located in respect to the lakes and streams of Indiana which fact facilitates distribution of bait minnows. They are also shipped profitably to out-of-state points, notably to southern states. One hatchery maintains a distributing center at Cairo, Illinois to enable regular distribution to boathouses and bait dealers in the T.V.A. lake area. Some states, notably Minnesota, Michigan, and Wisconsin bar the importation of uncolored goldfish, thus restricting the bait market somewhat.

The raising of numerous varieties of aquatic plants also constitutes a profitable by-product for the fisheries.

## SUMMARY

The extensive raising of goldfish at Martinsville is a nice example of intensive use of swampy land that would otherwise have little value. Adequate uncontaminated water supply, favorable climate, relatively central location, availability of good highways, and adequate and rather inexpensive skilled labor supply have all been highly significant.

In the future the ponds may well be used in raising fish for human food as well as for bait and beauty. The U.S. Dept. of Agriculture recently has been actively encouraging the establishment of fish ponds (*Farmers' Bulletin*, No. 1938, 1943). In case commercial raising of meat fish becomes profitable, the fisheries at Martinsville have an opportunity to participate successfully.

# CH'ANG-CH'UN

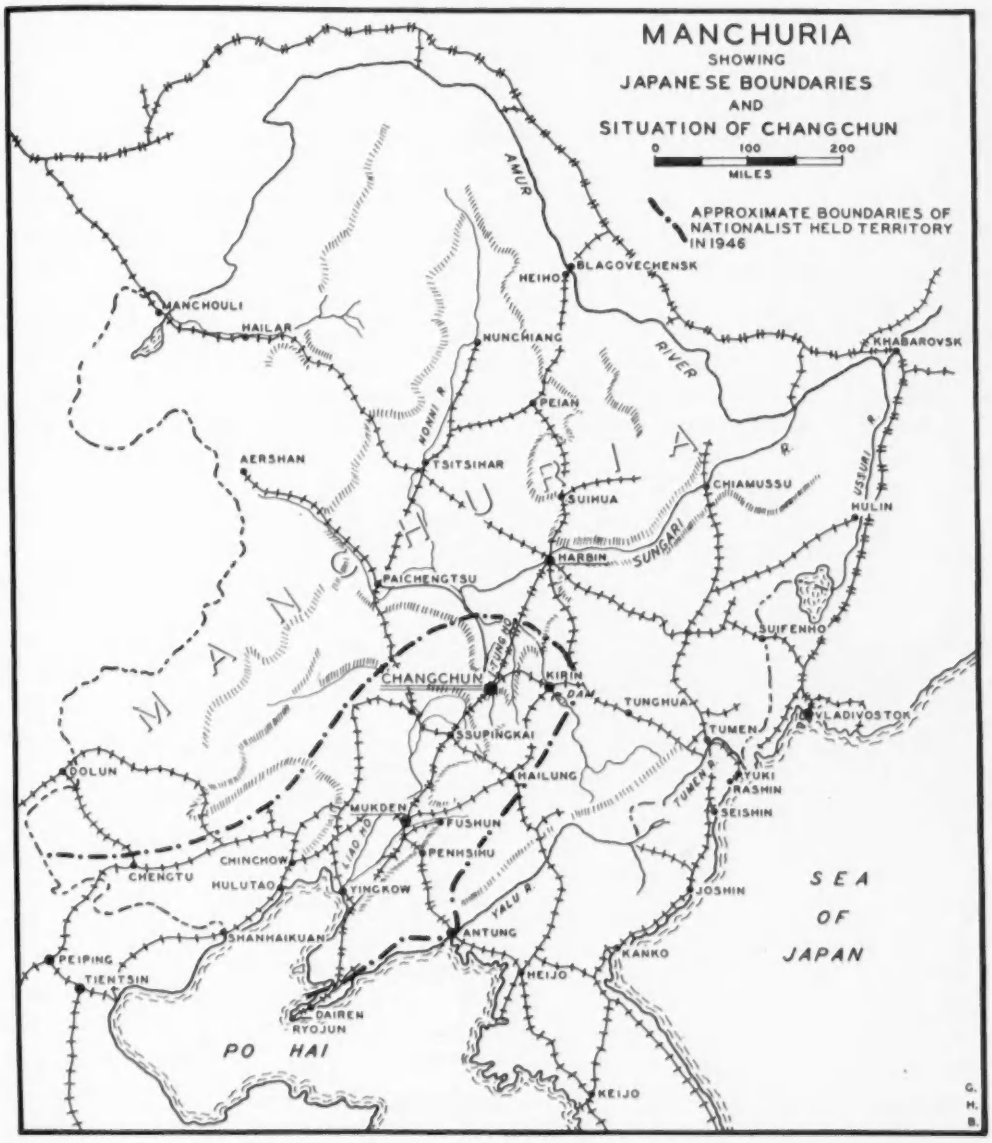
*Norton S. Ginsburg*

WHEN the Japanese first decided to take over Manchuria in 1931, to protect their widespread investments in that area and to offset the influence of the Soviet in Eastern Asia, they were faced with the problem of choosing a site for the capital of a new Empire ostensibly independent, but actually dependent in full on the strength of the Kwantung Army and the economic power of the Japanese industrial and commercial cartels. They chose after much deliberation the Chinese city of Ch'ang-ch'un and renamed it Hsin-king or Shinkyō, the New Capital.

The reasons for the choice have never been well defined, but it is possible to enumerate the probable desires of the Japanese in deciding the major issue. First, they desired a site close to the center of the country from which they would be able to control both the economical and military development of the new country. Second, they desired a point already well-integrated into the transportation pattern of the country, which in terms of railroads was already one of the more highly developed regions of the world. Third, they desired a site which was not so compactly built-up as to prevent the laying out of a completely new city, divorced from previous construction of the Chinese or Russian governments.

For different viewpoint: "Our hurt and exasperation with the Japanese over the recent war naturally disposes us to emphasize their undesirable characteristics and too often to forget the good that is in them. . . . The young officers began as reformers with worthy ideals. . . . There is (or was) (T.N.: There was) at Hsin-king an interesting expression of these early ideals of the young officers in an attractive painting placed at the turn of the stairs in the capital building. This picture showed five little maidens, hand in hand, skipping joyfully down a broad path symbolizing opportunity. Each was dressed in a traditional native costume, one Manchu, one Mongolian, one Chinese, one Korean and one Japanese, all living happily together. It was for this ideal that many of the young men of Japan gave their lives. The wish to change Manchuria from a land of conflict into a land of peace and plenty was implicit in much that was done." (H. Foster Bain, "Manchuria: A Key Area," *Foreign Affairs*, Vol. 25, pp. 106–118.)

Ch'ang-ch'un would appear to have satisfied all such requirements. It is located at latitude 43° 53′ N. and longitude 125° 18′ E., 240 km. south of Harbin and about 704 km. north of Dairen, the existing capital of the Japanese economic empire in Manchuria. It is also about 400 km. north of the former capital of the Manchu and Chinese regimes in Manchuria and the trade center of the south, Mukden (Shen-yang). Furthermore, the city is located just north of the low, inconspicuous range of hills which runs east-west across the country and forms the divide between the drainage systems of the Sungari River in the north and the Liao River in the south. A site north of the divide may have appeared more desirable than one to the south of it, since the Japanese were desirous of developing the country to the north and thereby further counteracting the influence of the Soviet in that area.




MAP 1.—When, after much deliberation, the Japanese chose the Chinese city of Ch'ang Ch'un as capitol of their newly established colonial province of Manchoukuo, they renamed it Hsin-king, or Shinkyo, the new capitol. They desired a site close to the center of the country from which they could control its economic and military development; a site already integrated into the transportation pattern of the territory; and a site that was still open to planning a completely new city without regard to previous Chinese or Russian influences.

Economically, the city is well placed between the great agricultural area in the north of which the formerly Russian-dominated city of Harbin is the economic center and the agricultural and industrial regions to the south which were in large part tributary to Mukden and had their outlet through the Japanese port of Dairen. The plains region in which Ch'ang-ch'un lies was even then outstanding in agricultural production and had a number of potentialities for development of industry and commerce. They included a fair

labor supply, excellent communications, raw materials for light agricultural-based industry, and potential power and water supplies in abundance.

In the second place, the city had long been an important pivot along the north-south railway system which has criss-crossed Manchuria since the early part of the 20th century. In fact at the time of the Japanese occupation Ch'ang-ch'un was the transfer point between the broad-gauge Chinese Eastern Railway centered at Harbin and the South Manchurian Railway which ran north from Dairen. It also was the terminus of the Ch'ang-ch'un–Tung-hua

FIGURE 1.—The main railway station at Ch'ang-ch'un. It is one of a series of impressive railway terminals erected by the South Manchuria Railway. The portrait above the main entrance is that of Chiang Kai-shek whose picture appears over entrances to most public buildings in Nationalist China.

Railway which was later to be extended eastward to Tū-men and from there to the Korean border where it was to join the Korean Railway system of which terminals are at the port cities of Yuki, Seijin, and Rashin. At the time the Chinese Eastern Railway was still under administration of the Soviet government and it was desirable to have the new seat of Japanese power on the continent in such a position as to well control that arm of Soviet influence in Manchuria. Control of the Manchurian Railway system had long been a major bone of contention between Japanese and Russians, as a historical survey of Manchuria since the end of the 19th century shows. Indeed, the matter of railroad control was one of the more important Japanese excuses for invading the country in 1931 and taking over administration from what had been considered a corrupt and incompetent Chinese government nominally under the Nanking government, but actually under the control of the so-called Young Marshal, Chang, Hsueh-liang, son of the great Marshal Chang, Tso-lin who had declared himself the semi-autonomous ruler of the country. It was also the transfer point for goods and passengers travelling from central Europe via the Trans-Siberian Railway. Traffic of this nature was surprisingly heavy, especially since it is thought generally that the Trans-Siberian Railway was largely restricted to Soviet traffic. In addition to its prime location as a railway center, the city was well situated as a future air and highway center for the entire country, and the Japanese had dreams of making it an international as well as a national center for all forms of transportation.

In the third place, the existing city of about 90,000 population covered a relatively small area just south of the yards of the Chinese Eastern Railway. Most of the population was concentrated in the so-called Old City, or Walled Town, a Chinese city with nonagonal walls and a relatively dense population. The Russians had constructed a small functional town, Kuan-cheng-tze, near their trackage and north of the Chinese city where employees of the Chinese Eastern Railway worked and where the Russian population lived. The South Manchurian Railway controlled by Sino-Japanese treaty an area of about 55 square km. to the south and west of the Russian town. Southwest of the

three major concentrations was a large rolling plain largely in soy beans and grains such as maize, millet, and kioaliang, an area near enough to the railway to be convenient and yet populated by a population small in numbers and therefore a minute obstacle to any large-scale plan of construction. Furthermore, the city was proved to have access to an adequate water supply; a potential power supply already was guaranteed by the Japanese grand scheme for the development of Manchurian water resources. For Ch'ang-ch'un the most important feature of this plan was the construction of the Kirin Dam on the upper Sungari sixty miles away.

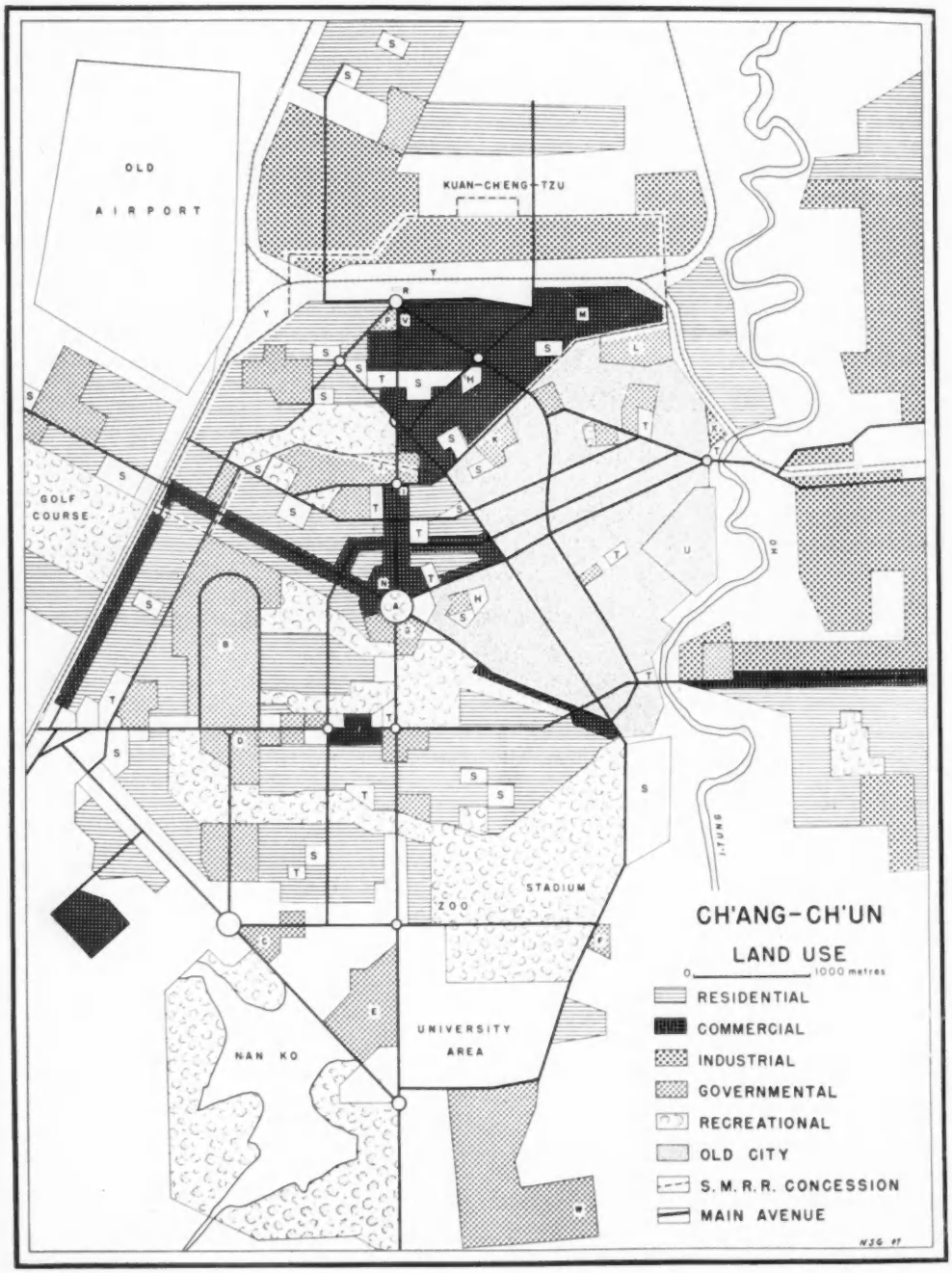
The two other cities under consideration were Harbin and Mukden. They were handicapped by the fact that they represented the power and government of the two cultures with which Japan had long been in conflict, Russian and Chinese, and for this reason alone they were subject to considerable disadvantage in competition for selection. Moreover, they were heavily built-up urban centers already occupying the best sites in their vicinities for the development of major cities and, though consideration of the expense necessary for the construction of a completely new metropolis must have been discussed, the initial Japanese plan for the erection of their mainland empire was so huge as to preclude necessity for consideration of money alone as a prime factor in selection of site for the new capital.

## THE CHARACTER OF THE CITY

Thus chosen, Ch'ang-ch'un seemed destined to play a major role in world affairs under the pseudonym Hsin-king. Today from the air Ch'ang-ch'un is a tragic tribute to the aspirations of the Japanese in East Asia. There are wide boulevards and elm-lined streets; parks dot the city and its suburbs; large modern buildings of brick, concrete, and stone rise from what was site of soy bean farms of which production at one time gave the older town the name "Bean City" of the world. The road pattern seems to radiate from a series of circles of which the most important is Ta-tung Circle in the center of the new city. A few hundred yards west of the circle is an elongated horseshoe-shaped park within which rises an abandoned steel and concrete skeleton intended for the palace of the puppet-emperor, Pu, Yi. Some distance to the south of this structure is Nan Ko, an irregularly-shaped lake in the middle of a park, used for pleasure boating in the summer time and planned as a source of water for the city in time of emergency. In the northwestern portion of the city are the race track and the golf course and the old airport. The northern part is covered with all the buildings and appurtenances that go with a major railroad system: yards, roundhouses, the main station, and tracks of the smaller branch lines that feed the main line.

Southward from the railroad station extends a major artery called Chuo-dori along which are the Mantetsu Building (the South Manchurian Railway), the Yamato Hotel, the Manchuria Information Office, the city shrine, the police station, and one of the department stores. South of Kodama Park where the street becomes Ta-tung Boulevard there is a concentration of governmental and commercial buildings such as the Mitsui and Nisshin Buildings, the Asahi Shimbun, and the Central and Industrial Banks. The outer portions of the municipal area have been subdivided and present an appearance much like that of an ambitious middle-western town set on developing into an important commercial and residential center, especially in the west and south. In

the east there is much new construction apparently still going on, but of a different nature than that in the aforementioned areas. Here are smokestacks




MAP 2.—The Land Use pattern of Ch'ang Ch'un reflects plans of its development as the Japanese formulated them, though not entirely. The growth of the city under Japanese domination, in some respects followed a course of natural evolution consequent upon the character and needs of the population, rather than the dicta laid down by the Japanese planners. On the whole, the pattern indicates a planned city.

and long, skylighted-roofs which denote industrial development.

To the south once more and just east of Ta-tung Boulevard is a concentration of large buildings somewhat smaller than those nearer the center of the city, but indicative of public rather than private, small-scale enterprise. They are buildings devoted to higher education, the National University, Ta-tung College, and the Hsin-king College of Medicine. Adjoining the campus are recreational and sports facilities such as tennis courts, a stadium, and a baseball field.

Off the accompanying map and westward is a series of regularly-shaped rows of connected dwellings characterized by the tall chimneys which set apart the north China and Manchurian dwellings from those in Japan and south China. Many of the former residents of the houses were workers at the airport. However, since most of these were Japanese, the houses are now unused and appear to be severely damaged in some instances. Near the concentration is the new airport.

Hsin-king is a planned city. The industrial areas are well set off from the rest of the city, north of the main railway station and east of the I-tung-ho. The stream valley contains many clay pits and brick kilns, but is otherwise unoccupied. Areas for public buildings and semi-private corporation buildings are restricted to certain main thoroughfares such as Ta-tung Boulevard and certain of its main tributaries. The new Imperial Palace was to occupy the large horseshoe-shaped area north of the circle named Junten in the western part of the city where it would have been partially surrounded by public buildings. Certain avenues other than Ta-tung Boulevard were selected as commercial streets, one of them being Nihon-bashi Street which runs southeastward from the railroad station. The street already was of commercial importance before the Japanese planners began work on Hsin-king. Parks and playgrounds are numerous. The three more important parks, Kodama, Ta-tung, and Junten from north to south respectively cross the city in three east west zones. Junten Park boasts a zoo in its eastern portion, but the animals have long since disappeared. The zoo is similar in appearance to Chicago's Brookfield Zoo which has artificial outcroppings and moats instead of cages.

FIGURE 2.—Typical transportation in Ch'ang-ch'un. Russian-style droshkies are common in Manchuria. The auto body on a droshky base is one of the ways abandoned Japanese equipment has been put to use. There are almost no civilian motor vehicles remaining in the city.

Original plans called for strict residential zoning according to assessed value of the residential unit. However, the city expanded so rapidly in its early days and the housing shortage became so acute later on that areas zoned for residential purposes were opened to all classes of residences. Rows of connected, single story dwellings have been erected on the outskirts of the city and near the center of the city where workers' barracks were needed. Most of the houses near government buildings are of individual, occidental types.

The Chinese city was left relatively intact, although several wide avenues were cut through its otherwise narrow street pattern and most streets and alleys were paved. The distinction be-

tween the Old and the New Cities is no longer marked since the changes were made. However, the streets of the typical Manchurian town are seldom so narrow and winding as those of towns in central and south China, for example. Along the eastern rim of the Old City is the pleasure or red-light district and between its northern edge and the railroad track is the market and milling area. The former Imperial residence is located just southeast of the market in a cluster of unassuming buildings surrounded by brick wall. There are few evidences of planning other than the street changes visible in the Old City. Dwellings, shops, schools, warehouses and godowns, temples, and government and military buildings are all intermixed.

Japanese zoning maps, although essentially correct, exaggerate considerably the true extent of built-up areas within the city. Even the latest available, dated 1942, shows the city as the Japanese planned it to be say in 1950. Large areas marked for use by big business are still vacant. Other areas zoned for residential and recreational land use are mere subdivisions and the roads indicated may be rutted dirt tracks. The accompanying map is a true land use map and not a zoning map, although much of the land use shown is derived from Japanese utilization surveys and not from temporary Chinese variations. It is interesting to compare the actual land use map with the zoning map and to see that the zoning ordinances were closely adhered to. The success of the zoning regulations appears to be marred more by incomplete construction, that is lack of time, rather than failures to obey them. Omitted from the map are peripheral settlements, suburbs may be a better term, which are included within the extensive municipal boundaries. Areas separating such settlements from the city proper are composed for the most part of agricultural lands, but on the Japanese maps they are laid out as subdivisions. The plan apparently was to establish the peripheral concentrations and then fill in the spaces between them and the city itself from two directions. The omission of the areas is of little importance at the present time since most of them, as previously stated, were inhabited by Japanese who have since been repatriated and they are for the most part abandoned.

FIGURE 3.—The Central Bank of China, formerly the Bank of Manchukuo. This building on Ta-tung Circle once housed the Manchukuan equivalent to the Bank of Japan. It suffered superficial damage during the periods of street fighting within the city.

FIGURE 4.—The former Manchukuan Telephone and Telegraph Building on Ta-tung Circle. This subsidized "special" corporation controlled a network of telegraph lines which covered the entire country. Every large town and city had a telephone system likewise under its control. The building is now a military headquarters.

## POSTWAR CHANGES

The seeming solidity and permanence of Ch'ang-ch'un as seen from the air is no more real than the soundness of the Japanese-inspired continental em-

pire itself since the defeat of Japanese arms, the collapse of the government, and the retrocession of the country to China. The government buildings have been gutted in large part by fighting within the city during the past year; the streets are pitted with holes and ruts; the parks are neglected and where the Japanese went flower-viewing a few months ago, the ponds are covered with the accumulated filth and scum of a single summer of defeat.

Ch'ang-ch'un is an excellent example of the disasters which have struck Manchuria within the past two years. With occupation of the country by the Russians in the fall of 1945, Japanese authorities surrendered control of the municipal government, although many were kept on to operate utilities and supervise existing bureaucracy. The Russians removed much of the equipment on which had been based the expanding light industry of the city and took into custody the heads of the larger companies whose headquarters were in Ch'ang-ch'un. However, at this stage, the city continued to exist with few variations from the norm since the bureaucracy carried on much as before, despite loss of their powers of decision. As a result the city presented a relatively unchanged aspect until the time of the withdrawal of the Soviet troops in February, 1946. The Russians left in Ta-tung Circle as a memento of their occupation a 60-foot stone obelisk surmounted by what appears to be a cast-bronze model of a twin-engined airplane. At this time the city fell into the hands of Chinese Communists who took over what was left after lootings which featured the brief interim period between Russian and Communist occupations and resulted in ransacking libraries and government records. The Communists attempted to control the vandalism and succeeded to a considerable degree, but they themselves were guilty of such actions as stabling their horses in the marble-floored State Council Building and several of the better residences which were of no other use to them at the time. Shortly thereafter, Nationalists took the city with heavy fighting and attempted to bring order out of the interim chaos. Their efforts were wasted, since the Communists retook the town in March, again with much heavy fighting and accompanying destruction. The Nationalists returned once more in April and drove the Communists north of the Sungari where they established their main headquarters at Harbin.

Fighting, and vandalism that accompanied it, wrought havoc in the city and destroyed much that had been

FIGURE 5.—Typical upper class residence east of the proposed Imperial Palace. Most buildings of this type were ransacked and stripped of fittings.

accomplished under the Japanese. The destruction was not localized to particular areas. Mobs apparently looted at random and armed clashes occurred in widely scattered areas. Government or corporation buildings suffered the most damage since they were used as fortresses. As a result there are almost no surviving records of the Manchukuan government in Ch'ang-ch'un today in the way of state papers or libraries, and most of the main buildings have so been

damaged as to preclude their use as offices or residences for years to come.

The headquarters of the Tairiku Kagakuin, the Continental Institute of Science which was the South Manchurian Railway-inspired, government-run agency for the pursuance of scientific research and study was destroyed. The agency is of particular interest to geographers and geologists since it was in part under the direction of the organization that a program of topographic and geological mapping for Manchuria was being carried out. The Manchukuan Land Survey, responsible for topographic mapping the great interior plains of Manchuria was administered under the Institute. Almost all records of the agency were destroyed at some stage of the political-military developments in Manchuria this past year and the building itself was gutted beyond repair. As a result it has been extremely difficult to obtain cartographic information and maps on Manchuria. The Geological Survey of Manchukuo, formerly the Geological Institute of the South Manchurian Railway and Manchukuo, was also under the Continental Institute and the results of its labors as well as most of the maps produced by it have largely disappeared. This is typical of the damage which will make reconstruction of the country more and more difficult. However, two libraries escaped destruction: the South Manchurian Railway Branch Library in the Mantetsu Building near the main station and the Bank of Manchukuo library which was in a sealed vault in the bank building, now the Central Bank of China Building on Ta-tung Circle. They, however, may be too small to have immediate effect on reconstruction problems which face the Chinese government.

FIGURE 6.—The present City Hall with pictures of Sun and Chiang. The wooden monument in the circle says "Raise yourselves and advance!"

## HISTORY AND DEVELOPMENT OF CH'ANG-CH'UN

The history of Ch'ang-ch'un is brief and extends back for only a little more than a century.

"What is now the city of Hsin-king was a century and a half ago a desolate grazing area. The first form of the community was established seven km. north of the present city of Changchunfu by the Hans. The pioneer settlers of *Hsin-king* were farmers from north China who migrated to this country when the place was opened to settlement by the Ch'ing Dynasty in 1791. The virgin lands attracted a greater number of settlers each year because of their fertility. In 1825 a provincial office was established within the present site of Hsin-king. Ch'ang-ch'un, as the place subsequently became known, soon grew into a sizable town.

"To protect the place from the ravages of brigandage then rampant, a huge wall and moat were constructed to encircle the town in 1865 by the voluntary contributions of the inhabitants. Unlike the typical checkered Manchurian city, the walled town of Ch'ang-ch'un was laid out into an unorthodox nonagonal shape. The wall had four large gates at the cardinal points and four small gates between these points. In addition to these there was an equestrian gate, making the total nine. Today all the gates except

the east gate are gone and hardly a vestige of the encircling wall remains." (Miura, Hajime, "Hsin-king, the Capital of Manchukuo," *Far Eastern Review*, XXXVII, [March, 1941] 95.) Reconstruction has been so complete that it is impossible in a short period of time to delineate boundaries of the Chinese city described here.

The town became the seat of the local government and remained such until the Japanese took it over in 1931. Meanwhile, Manchuria was being opened up to the outside world despite the general ban placed on trade in Manchuria by the Manchu dynasty. Russia procured rights to build an extension of the Trans-Siberian Railway to be called the Chinese Eastern Railway across Manchuria, thereby saving a several hundred miles run around the Amur river bend. In 1899 the Russian government obtained permission to extend the Chinese Eastern Railway southward from Harbin to Port Arthur. The line was built through Ch'ang-ch'un and the Russians made the village of Kuan-cheng-tze, northwest of the town, one of their main stations. The Russians built shops and warehouses and stimulated promotion of commercial enterprises. By the treaty of Portsmouth in 1905 Japan was handed the line of the Chinese Eastern Railway from Port Arthur to Ch'ang-ch'un. Almost immediately, the gauge of the newly-won railway, renamed the South Manchurian Railway, was standardized to 4′ 8″. Since the Chinese Eastern Railway north to Harbin continued to be the broad Russian 5′ gauge, Ch'ang-ch'un attained new importance as a transfer point and the northern terminus of the South Manchurian Railway, a position it held until 1935 when the Soviet government sold all its interests in the Chinese Eastern Railway to Japan and Manchukuo.

After the Japanese had designated Ch'ang-ch'un as the new capital they formulated a plan for construction of the new city and formed the National Capital Construction Bureau in 1932. The organization had the task of constructing the new city and integration of the old South Manchurian Railway zone, Kuan-cheng-tze, and the old Chinese city. It is noteworthy that the old city had long since overflowed its walls and that there had been considerable construction going on in what has become the commercial district of Ch'ang-ch'un, including the Yamato Hotel just south of the main railroad station. The hotel had been built in the early 20's as part of the program of the South Manchurian Railway to establish a chain of railway hotels in the main cities along the railway.

FIGURE 7.—One of the few remaining street-cars in Ch'ang-ch'un as decorated for Chinese Air Force day. Ch'ang-ch'un formerly had a modern system of street-cars and busses. Only a few of the former and almost none of the latter have survived.

The main part of the construction program dealt first with the newer areas. To this end an area of about 79 sq. kms. was selected for the preliminary construction out of the 200 sq. kms. originally delimited as the site of the capital and which included the older parts of the city. This primary area has also been described as being 100 sq. km.,

but the former figure should prove to be the more reliable. The original plans were changed several times before the final operating plan was put into effect. However, some of the general standardizations of the first plans were maintained and put into effect as far as possible. All buildings were to be no higher than 20 m. in order to "eliminate whatever discomfort that may result from the construction of skyscrapers, and diminish the potential damages in the event of natural calamities." Streets were standardized to the following widths:

Class I.....60–26 m. wide
Class II.....18–10 m. wide
Class III.....less than 10 m.

Class I roads have a central lane of 16 m. and are bordered by grass and tree-covered curbings on either side. Between curbings and sidewalk there are 12 m. lanes for slower traffic, since there was no expectation of changing completely the Chinese methods of transportation, the classic two-wheeled cart or the standard local kind of passenger vehicle which is a variation of the Russian four-wheel horsedrawn droshky. Streets which meet Class I standards are few. They are Ta-tung Boulevard, Kojin Boulevard, Ch'ang-ch'un Boulevard, Koan Avenue, Junten Boulevard, Shimbatsu Street, and Shisei Boulevard. All streets were to be paved with asphalt, cement, or brick as the situation demanded. Parks were to be an essential part of the construction program and the city has 7 per cent of its present area devoted to parks. In the final plan 55 per cent of the total area of the 79 m. area was devoted to government buildings and public grounds. The remaining 45 per cent was devoted to residential, commercial and industrial areas.

FIGURE 8.—Japanese being inoculated against typhoid and typhus before repatriation. The partial breakdown of the municipal water supply and the intense crowding of Japanese families into small areas resulted in minor epidemics. In the summer of 1946 there were 100 deaths daily due to typhoid alone. The inoculation program was undertaken by Japanese doctors to prevent spread of typhoid and typhus to Japan itself.

The program of construction was divided further into two parts, the first calling for a Five-Year Plan of construction covering about 21 sq. km. This plan was completed from 1933 to 1937 after the main street pattern had been laid out and sewers and power lines had been placed underground in their prescribed positions. The second, a Three-Year Plan, was devoted to reconstruction of the Old City. It began with the reorganization of the National Capital Construction Company as the Provisional Capital Construction Bureau in December 1937. The plan was completed in 1942 and resulted in widening streets in the Old City, considerable new construction, and final destruction of remnants of the old walls.

The problem of water supply was considered at length in order to assure adequate supply for expected growth of the city. The South Manchurian Railway had already sunk several wells into substrata in the area, which promised an assured water supply for a city of over 300,000 population. Twenty wells were sunk that yielded a supply of 11,000 cubic meters of water daily.

However, until last January chief source of water was the reservoir at Ching-yueh-tan, 12 km. southeast of the city, in which is stored water from the Hsiao and Tai Rivers, small tributaries of the I-tung Ho. The dam is earth-filled with a concrete face (see photo) about 300 m. long and about 40 feet high. The dam was constructed between 1933 and 1935 and supplied the city with 20,000 cubic m. of water daily, the capacity of the Nan-ling pumping station located in the southern part of the city east of Nan Ko. Cities with predominantly Chinese populations (ca.300,000 in Ch'ang-ch'un) demand much less water than a western observer might expect.

However, after successive occupations of the Russians and Chinese Communists the supply of water was cut and present supply for the area comes from artesian wells which were to be used as auxiliary after the construction of the dam. The exact reasons for elimination of this major source of water are not clear. However, it is believed the Russians had removed much of the pumping machinery at the dam and destroyed what was not movable. Also, all along the route from the dam to the Nan-ling pumping station there were scores of pipe sections about 1 m. in diameter lying along the right of way under which the pipe line had been laid from the dam to the pumping station. Since there had been several washouts of culverts through which the original pipe had gone, this would indicate that there had been some breaks in the line just previous to the armistice, and that the Japanese had been in process of repairing them when their empire disappeared. There is possibility of Japanese sabotage of equipment, but it is unlikely, since there was a large Japanese population in Ch'ang-ch'un dependent on the local water supply whose lives would not have been endangered. In any case the existing water supply is hardly adequate to supply needs of a population already much shrunken by repatriation of the Japanese, let alone any industry heavy or light should they still exist.

The power situation is more favorable than that of water. Before 1943 the source of power in Ch'ang-ch'un was steam power from plants supplied with Fushun coal. The supply was supposed to be adequate for a residential city about the size of Ch'ang-ch'un in 1939 (381,135). However, there was hardly enough for an expansion of industry. In 1936 construction was started on a dam 22 km. upstream from Kirin. The dam is one of the largest in the world and was expected to have a 500,000 kilowatt-hour capacity electric plant. Ch'ang-ch'un is about 130 km. from the dam and has been supplied since 1943 with all the power it can use. The dam is undamaged and should be one of the major prizes obtained by the Chinese from years of Japanese occupation. There was no concerted effort by the Russians to remove essential work-

FIGURE 9.—View of the dam at Ching-yueh-tan, twelve kilometers southeast of Ch'ang-ch'un. Before the armistice the pumping station supplied the city with 20,000 cubic meters of water daily, about two-thirds of the total. Pumps have been damaged and the pipes leading to the city appear to have been cut.

ing parts from the power plant there and the transmission lines are still in order. In the spring of 1946 representatives of the Nationalists and Communists met under auspices of the American-founded Executive Headquarters based in Pei-p'ing and agreed to regard the dam and power works as an essential national asset and therefore not subject to reprisals on the part of either group. How long this state of affairs will last is open to question, since it is to the present advantage of the Nationalists to have the power supply available, whereas the Communists have a lesser interest. However, they, too, are receiving power from the dam in Harbin according to reports from the Nationalist G-2 in Mukden; furthermore destruction of the dam would lose not only that asset but also the respect of relatively neutral foreign observers in the field and would give the Nationalists another talking point against Communist policies in Manchuria; wanton destruction of 130,000,000 Y worth of equipment cannot be passed over lightly.

FIGURE 10.—View southward down Ta-tung Boulevard toward Ta-tung Circle. Note wide center street with narrower lanes on the side for slow traffic.

Telephone and telegraph lines have been buried so that the city is unique among cities in China in that there are no telephone or telegraph lines and poles to obstruct vision and spoil the effect of thorough planning. Both systems were under the control of the Manchukuo Telegraph and Telephone Company and there are connections by telephone and telegraph with all the major cities of Manchuria. There are also cables connecting Ch'ang-ch'un with Japan and, though these are no longer in use, they still exist. The local telephone system is working, though there have been no repairs of lines and circuits for the past year. It is, of course, impossible to obtain new telephones and the Chinese Ministry of Communications through the Northeast China Command in Mukden has been trying to obtain new equipment from both China and Japan, thus far without success. Service is mediocre, but it is still possible with some luck to get a connection on a standard dial phone by considerable patience and effort. It is interesting to note that the telegraph lines between Nationalist and Communist territory are still in working order, although it is not possible to put through any messages except with permission of the Chinese Army in the city, and this it is almost impossible to obtain.

Ch'ang-ch'un possessed one of the largest radio stations in Manchuria. Most of the equipment in the four separate buildings of this system has been removed within the past year. The station is no longer operating, although the physical plants themselves are reported to be undamaged. It is probable that what was not removed to the north by the Russians or the Communists was previously destroyed by the Japanese or was taken over by the Chinese military authorities for use in their communications system.

Original plans which called for placing all railway trackage underground, were never put into effect, since the outbreak of the war with the United States brought a halt to this as to most non-

essential construction. Plans that also provided that busses replace tramways throughout the city, were never realized although it appears that there was regular bus service on the main traffic arteries of the city. Although busses are no longer operating, there are several tramways still running.

The Japanese planners had no desire to make the city an industrial city and mention the lack of coal and ore as well as the lack of a skilled labor supply as the major reasons for the small heavy industrial development. Furthermore, presence of any heavy industry would destroy in part the desired position of the city as the major national administrative center. Therefore, only light industries considered suitable to this status were encouraged. They included flour-milling, tobacco manufacturing, and the like. The only large-scale industry indigenous to Ch'ang-ch'un rose after World War I when there was a great demand in China, Japan, and the United States for soy bean cake and oil which had developed into an important industry in Manchuria. Ch'ang-ch'un became center of the development and received the nickname, the "City of Beans." The nickname undoubtedly is of Japanese origin and, since the industry was Japanese dominated, was probably an effort of the local Japanese Chamber of Commerce to advertise products of the Japanese firms they represented. However, loss of the American market through a rise in tariffs and a general world-wide depression effectively wiped out the industry. In addition to flour mills and tobacco factories mentioned previously, weaving mills, match factories, toilet article manufactories and the like were encouraged by the Japs as being relatively in keeping with their main policy of maintaining a capital city of dignity and beauty. On the other hand, the demands of the building trades created a number of lumber, brick, and contracting agencies whose facilities were being overtaxed constantly as the city expanded. Furthermore, the railroad shops and the main roundhouse partook of the character of heavy industry. Nevertheless, isolation of all areas devoted to such trades is so marked as to represent a very minor threat to the planners' dream. All plants are now in the hands of Chinese, usually former employees of the Japanese, but many of them are in no condition to be used until extensive repairs are made.

Under the category of commerce comes a unique type of company, one which contributed fundamentally to the development of the city. These were the so-called Special and Semi-Special Companies. All such companies were subsidized by the Japanese government, in this case through the Manchukuan government, and followed general policies laid down by that government, although each company functioned locally with considerable independence. The industrial monopolies had offices located in Hsinking and most of them had their main offices located there. Certain exceptions to the latter rule were such agencies as the Southern Manchurian Railway and the Manchukuan Mining and Industrial Development Company both with headquarters in Dairen. However, even they are reported to have been considering moving to Hsin-king before the war interfered. Such concentration of industrial goliaths with their great new buildings and their demands for personnel to keep all their papers in order created an enormous vacuum into which poured skilled workers from Japan and Chinese from the surrounding areas, anxious to share in the wealth brought to the city. They were responsible for rise of the city's population from 90,000 in 1930

to 210,000 in 1936 to 355,000 in 1938 and over 450,000 in 1942. The meteoritic rise in population was approaching the immediate goal of 500,000 population set by the planners and much concern was felt about future expansion. However, after 1943 there was no time to worry about such trifles and important building materials were earmarked for more essential demands.

It is not meant to imply here that the Japanese in Manchuria ever seriously contemplated defeat and therefore stopped their program of expansion. On the contrary, few believed in the possibility of defeat and almost all were convinced of the invincibility of the Kwantung Army which became the residual seat of effective government once the war crisis was reached. The argument is assured, for example, by the beginning of construction on the Imperial Palace in 1943. It was never completed, but the size of the concrete and steel framework is impressive and the completed swimming pool of violet tile (the color of the orchid, the Imperial flower) gives some indication of the plans drawn up for it. It now stands alone in a weed-grown field symbolic of the fall of the doll whose house it was to be.

### REPATRIATION OF THE JAPANESE

Most of the Japanese have now been repatriated, although a few thousand are being retained to keep some of the utilities in working order. The plan of procedure for repatriation is much like that in other Chinese cities having a large Japanese population. The Japanese always have had a Japanese Association which represented the Japanese in matters of public (i.e. Japanese) concern. The organization chooses the various families scheduled to leave on certain dates specified by the Chinese authorities. The people chosen are given a few days to finish their packing and see relatives. They are then placed aboard open flat cars and sent via the Southern Manchurian Railway (renamed in this area the "Chang-ch'un–Shen-yang Railway) down to Hu-lu-tao on Liao-tung Bay. There they are loaded into American LST's and sent in most cases to Sasebo in Kyushu. Most of the present repatriation is carried on in Chinese-manned and owned LST's Lend-Leased to the Chinese, but in recent months the repatriation has been held up by diversion of some of the ships to the growing Chinese Navy operating off the northern coast of Shantung Province. The repatriates are allowed to take with them only a limited number of possessions including a small amount of local currency and jewelry. Therefore most have tried to dump their more valued possessions on the local market in an attempt to obtain articles like bedding which have a much larger allowance. Thus it was possible in the summer and fall of 1946 to buy pearls, obi, records, kimono, kakemono, furniture, bicycles, and cameras at prices far below that of the normal thieves market. This has in effect made more difficult the rebuilding of the town, since the Chinese townspeople find it far more profitable and far easier to trade in Japanese goods purchased or stolen during the lootings than to operate Japanese businesses. The large Japanese military forces in Ch'ang-ch'un have disappeared. Wives of the men report that their husbands were taken into custody by the Russians and transported northward. In any case there are none to be seen today except the sick and aged and some employed as slave labor at the airfield.

### THE PRESENT MILITARY AND POLITICAL SITUATION

Ch'ang-ch'un is now headquarters for the Nationalist New 6th Army,

the seat of local government, and the most northerly major city in the hands of the Nationalists and therefore the most important outpost against the Communists in the north. Until recently, it was also the site of the Advanced Executive Headquarters.

The New 6th Army has occupied all of the Japanese barracks as well as many public buildings which may be in good condition and it constitutes the supreme authority in the local government. Military supplies therefore compose the major part of the imports carried via rail from Mukden. The military plan has been to consolidate the Ch'ang-ch'un area and then to launch an attack on Narbin and other large north Manchurian cities. The Communists apparently have taken the initiative before the New 6th was able to launch its own attacks. Meanwhile, the Chinese military commander in Ch'ang-ch'un controls most of the territory along the railroad north to the bridges over the Sungari River and east to Kirin.

Advanced Executive Headquarters, recently disbanded, was composed of Americans, Nationalists, and Communists and was organized in the winter of 1945–6 as part of General Marshall's program to bring peace to China. The central headquarters were in Pei-p'ing, but an advanced section was set up at Ch'ang-ch'un where it was possible to be nearer the full scale Civil War then going on in that country. The mission was not accomplished. However, the Americans at least managed to contribute to the stabilization of the local economy by large scale purchasing of Japanese-dumped luxury items such as obi, kimono, cameras, etc. from local Chinese merchants. The effective work of the organization has been very small, although there have been truce teams in the field for several months, since the scope of the struggle is nationwide and beyond the local situation.

As the northernmost major city in Nationalist hands, it has been recognized as a prime cog wheel in the reconstruction machinery of the Nine Northeast Provinces, as the Chinese prefer to call Manchuria. But the administration, though headed by a capable and forward-looking University of Wisconsin graduate, H. C. Chao, is too much hampered by the military situation to tackle important civil problems. However, as a local administrative center and as the most important market for the agricultural products of the surrounding areas, it retains an importance similar to and somewhat greater than that which it held under the warlords.

### The Future of Ch'ang-ch'un

There is only the faintest possibility of correctly predicting the future of a city located in the midst of an area torn by war and banditry. At the present time Ch'ang-ch'un lies like a huge nut between a pair of giant pincers in the form of the Nationalist HQ at Mukden and the Communist HQ at Harbin and Chimamussu. Both Mukden and Harbin are older and more important in the history of China and Manchuria than Ch'ang-ch'un itself. It is most likely that, assuming an eventual resolving of the civil strife, one or both of the two will supersede it in the economic and political life of the country. This is further borne out by the policy of the United States State Department which plans to have a consul in Mukden and a consul-general at Harbin once that city is opened to foreigners. The present vice-consul in Ch'ang-ch'un is there temporarily until that time arrives.

The Chinese Northeast China Command is now located in Mukden, a city relatively free from war damage and larger and better established over the

past few score years than the nearer Japanese city. Mukden also was the former capital of the Ch'ing Dynasty before it moved down from the plains of Manchuria to those of North China. This makes it an important historical fixture in the political life of China and would lead to the supposition that it will become the permanent capital of the Nine Northeast Provinces. Harbin, on the other hand, possesses all the elements of a foreign city on Chinese soil which have become so distasteful to China since the rise of the Kuomintang. Nevertheless, it is superior in proximity to the resources of northern Manchuria than Ch'ang-ch'un and is better located from the point of view of communications with the Soviet Union whose influence will continue to be heavy in Manchuria. Harbin is the natural capital of the north just as Mukden is the natural capital of the south. Ch'ang-ch'un lying between the two will suffer proportionately as the development of the two cities continues. The Japanese had decided on a political capital free from the ties which bound Mukden and Harbin to the past with little regard for cost, but China can ill afford to bear the financial burden of more than one large political city under her shaky economy. Nanking alone has been a heavy drain on the treasury in the past and will continue as such even after the plans for construction of the national capital are completed.

In spite of such arguments, conversations with some of the Chinese municipal officials in Ch'ang-ch'un lead to the belief that China possibly may choose to regard the results of Japanese investment in the political city too great to lose and they appear to regard its maintenance as a desired factor in raising the prestige of Chinese administration in the newly acquired territories.

It is of interest at this point to note that Nine Northeast Provinces are regarded for the time being as a semi-autonomous unit, maintaining relationships to the mother country similar to those in effect during both the Ch'ing Dynasty and the Republic when, whatever the official attitude was at the time, the country was in fact semi-autonomous. In Mukden today the command of the territory in Nationalist hands (only about 25 per cent in total area, but including about 75 per cent of the industrial areas) is under the NECC, a military organization which has under it bureaus representing the Ministries in Nanking. The Chinese are anxious to show that Manchuria is in effect Chinese territory and no other, but the habit of thinking of the country as in some ways independent is strong. It is possible therefore that regional pressure will necessitate the maintenance of a special regional capital, but at the same time the National government in Nanking may desire more strongly than ever to prevent the rise of such symbols of autonomy, thereby depressing the importance of the town proportionately. Almost all officials in Manchuria representing the government are from south China except those in Communist territory, who are for the most part from Shantung Province.

Ch'ang-ch'un has essentially the same assets it had before the Japanese occupation. In communications, it is a major rail center, being the terminus of the Mukden–Ch'ang-ch'un line, the Ch'ang-ch'un–Tumen line, and the Ch'ang-ch'un–Aershan line. It is also as near to the important railway junction of Ssu-p'ing-kai, now almost completely in ruins, as is Mukden, and it possessed large railway repair and maintenance yards, relatively undamaged, albeit long since looted of most of their machinery, a situation true in Mukden and probably in Harbin as well. How-

ever, since 1935 when Japan purchased the Chinese Eastern Railway from Russia, it has not been a transfer point. Japanese-built highways radiate from the city in all directions, but their importance should be minimized since the roads are in pitiful shape and even a jeep had difficulty in negotiating the supposedly excellent highway between Ch'ang-ch'un and Kirin. The new airport is being enlarged and it was expected in September that elements of the Chinese Air Force would move into it shortly. The runways are being widened by Japanese labor to accommodate planes the size of C-54's. The older airport is no longer in use.

The farming country around the city is rich and crops include maize, millet, kiao-liang, wheat, soy-beans, vegetables, and commercial crops such as tobacco and hemp. The countryside has been relatively undisturbed and still looks to the city as its outlet for excess goods. The crops this past year have been good and were too green last spring to have been conscripted by the various forces operating in the area.

Power and water are available in abundance, though the latter supply has been endangered by the damage to the pipeline from the reservoir. There are supplies of lumber and other building materials left by the Japanese, enough to salve a few of the major wounds the city has suffered, although they will not solve the need for such materials for long, and window glass is completely unavailable. The numerous kilns along the I-tung Ho may be put into shape and cement plants northeast of the business district made operational.

It should be assumed that Ch'ang-ch'un will never rise to the level of importance it attained as capital of Manchukuo, but its excellent situation and the numerous assets remaining from the Japanese occupation should enable it to challenge the positions of Mukden, Dairen, and Harbin as one of the first cities of Manchuria. The answers to questions regarding its future will be found in the solutions to China's present political ills and to the foresight and ability of the Chinese government to utilize resources of her wealthy and populous northeast provinces.

# RECONSTRUCTION OF PHILIPPINE AGRICULTURE

*Alden Cutshall*

PHILIPPINE economy has been predominantly agricultural; almost 70 per cent of the 16,000,000 people are dependent upon agricultural industry. Most of them are small landowners or tenants, or agricultural laborers on larger sugar, abaca (Manila hemp), tobacco or rice estates. Return to somewhat normal life has not been too difficult for the small farmer who works small acreage by semiprimitive methods and thus has only small investment in equipment and supplies. However, in prewar years about one-third the cultivated area was used for production of export crops (sugar, abaca, coconut products, and tobacco). Production of such crops was, to a large extent, plantation agriculture and hence dependent upon greater expenditure for machinery and other equipment and power to move it. Secondly, as result of the war, each of the export crops must face individual problems in approach or attainment of prewar production figures.

## Sugar

Prewar sugar exports from the Philippine Islands were almost 1,000,000 short tons. But the 1946–1947 crop was only 78,000 tons (all 1946 production figures, as well as 1947 or 1948 estimates are quoted from "Agricultural Situation in the Philippines," *Dept. of State Bulletin*, Vol. XVI, No. 407, April 20, 1947, p. 719, or from *Foreign Commerce Weekly*, Vol. 27, No. 10, June 7, 1947, pp. 17–19), not enough to supply domestic requirements. New plantings are progressing, but are handicapped by shortage of machinery for preparation and cultivation and shortage of points for planting. It is thought that production in 1948 may provide 150,000 to 200,000 short tons for export, although the estimate may prove to be overly optimistic. Of the 41 prewar sugar mills in the Commonwealth, 32 intend to be in operation this year. There is general feeling in the sugar industry that it will be profitable to rebuild under terms of the Philippine Trade Act (Bell Bill) because the Philippines is the only sugar-producing country having a guaranteed market. Whether quotas belong to mills or to planters is a question that has not been answered. However, it has precipitated a new system of crop division, a 65 to 35 ratio in favor of the planters, in lieu of the former 50–50 division. The change in ratio no doubt results, in part at least, from general socioeconomic unrest in the Philippines and agrarian reform that is evolving in all parts of the islands. For example, rice farmers of Central Luzon also have received a more favorable system of crop division than in the semifeudal agrarian system inherited from the Spanish regime and continued with slight alteration until last year.

## Copra and Coconut Oil

Outstanding feature of the coconut industry, as compared with the other export crops, is its remarkable recovery since the end of the war. However, the recovery is not surprising when all facts are considered. Supply of coconuts available for production of copra and

coconut oil was actually greater after termination of the war than it was in 1941. Major problems which confronted recovery of the copra industry were not related to planting, cultivation, fertilization and milling, as in the sugar industry, but associated with critical transportation situation and return of laborers to the industry. With production of 650,000 long tons of copra last year and estimated production of 750,000 long tons this year, the outlook for the copra industry is most encouraging, for average annual copra production during the years 1934–1938 was slightly less than 600,000 tons (268,000 tons were exported during the first quarter of 1947). It is estimated that about 100,000 tons of the 1947 yield will be crushed in the Philippines, which indicates that current crushing capacity is not more than 50 per cent of prewar facilities. At present, only one large crusher is in operation. However, the Philippine Refining Company, one of the largest crushing companies and a Lever Brothers subsidiary, expects to open new plants. Estimated production for 1947 may not materialize if price of Manila hemp rises sufficiently to divert labor from coconuts in dual-crop areas, or if foodstuffs again become scarce and require diversion of labor into that field. Furthermore, increase in production over the prewar figures may not be permanent. Coconut oil must compete with other vegetable oils, particularly soya bean oil in the United States. Increase in soya bean acreage in America will likely be reflected in our imports of tropical oils when the market again becomes saturated. Secondly, as result of political instability, export of copra from the Netherlands East Indies, the Philippines principal prewar competitor, was well below normal last year. The Indies can be expected to offer more serious competition in the future.

## ABACA

The abaca plant, a member of the banana family, is grown entirely for its yield of coarse fiber known as Manila hemp; it is considered to be the world's best cordage fiber. The 1946 production of abaca was almost 110,000,000 pounds (all grades), less than one-third of the average annual prewar production. However, if all abaca in the Philippines were fully utilized and efficiently stripped, yield could be raised to approximately 250,000,000 pounds for 1947. One reason for low output last year was failure to strip abaca extensively until the price increase in August and again in November.

The Davao region of Mindanao was the principal abaca-producing section before the war. It contained the largest settlement of Japanese and they controlled much of the Manila hemp industry, for they practiced a more careful selection of varieties and used greater care in cultivation and more modern processing techniques than was generally practiced elsewhere. The Davao area produced about 60,000,000 pounds last year. The relatively low output is explained by the fact that the former Japanese plantations in the Davao region were abandoned, partly because there has been no final disposition of Japanese lands, but also because of lack of skilled personnel and shortage of stripping machinery. Many plantations were near the end of their profitable life by 1945 and there were no plantings during the war years, so much of the industry, probably as much as 50 per cent of the 175,000 acres in the Davao area, are marginal and will not be redeveloped. Hence, for a long range outlook, it may be more economical to plant virgin lands elsewhere in Mindanao than to attempt to clear and replant abandoned Japanese plantations. The

problem of new plantings is largely financial; but there is little available capital in the Philippines and the United States. British operators, although interested, are hesitant to invest in the Philippines until completion of preliminary investigations elsewhere in Southeast Asia and Middle America. Other abaca-producing areas of the Philippines (Southern Luzon, Samar, and Leyte) experienced less damage; but they are small farm areas, and trends had been downward for several years prior to Japanese occupation. In the area growers are finding it more profitable to concentrate on coconuts or food crops.

## TOBACCO

It was assumed by some economists that tobacco production and manufacture would be among the first industries to attain prewar position. That has not been the case, for the tobacco industry is probably in a more critical condition than any other phase of Philippine agriculture. The big problem results from loss of market. Both cigar and cigarette tobaccos have been produced in the Philippines and most of the production processed in Philippine factories. Outside the domestic market there was significant export of cigars to the United States, and secondly to the countries of Pacific Asia. Currently, the formerly profitable cigar industry is handicapped by higher labor costs and hence by high cost of hand production and is unable to compete for the United States market. Lack of factories, which were destroyed or damaged during the war, has also contributed to the critical condition of the industry. Most Philippine tobacco was produced in northeastern Luzon where the National Tobacco Corporation has attempted to maintain a policy of subsidized tobacco prices in order to protect the nearly destitute Cagayan Valley farmers.

The Filipino has shown a preference for American or American-type cigarettes. The trend began about 1920 and by 1937 the Philippine market for American cigarettes had equaled the market for domestic production. Some Filipino factories imported American tobacco to blend with the domestic product in manufacture of an American-type cigarette for the Philippine market. Hence over the past quarter century, production of cigars has remained fairly constant, but manufacture of cigarettes has decreased markedly. No doubt preference for American cigarettes is greater today than it was in 1941, making the Filipino tobacco farmer even more dependent upon the cigar industry than previously.

The situation may improve, however, as economic conditions in the islands become more stable. Coöperative marketing organizations can aid the industry significantly for the tobacco farmer probably has only a fraction of an acre in tobacco and may be so unfamiliar with marketing methods as to be at the mercy of the itinerant buyer or local warehouseman. Although the domestic market, especially for unprocessed and semiprocessed products, is not small, future of the industry cannot become optimistic unless the foreign market, particularly the cigar market, can be regained. At the moment that appears difficult, if not impossible.